JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

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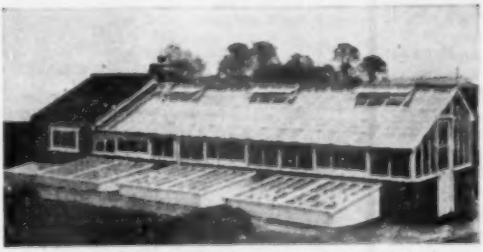

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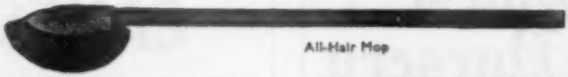

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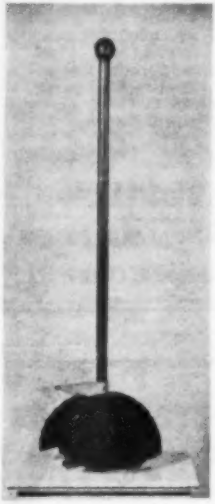

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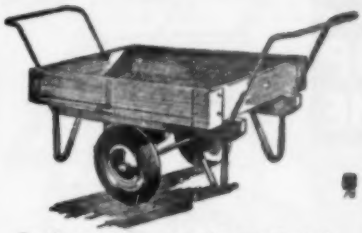

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JOURNAL OF THE ROYAL HORTICULTURAL SOCIETY

Vol. LXXV Part 10

October 1950

THE SECRETARY'S PAGE

ANNOUNCEMENTS—OCTOBER AND NOVEMBER

Shows

TUESDAY, October 10 12.30 P.M. to 7 P.M. WEDNESDAY, October 11 10 A.M. to 5 P.M.	Fortnightly Show. Autumn Fruit and Vegetable Show.
TUESDAY, October 24 12 NOON to 6 P.M. WEDNESDAY, October 25 10 A.M. to 5 P.M.	Fortnightly Show. Tree and Shrub Competition. Floral Arrangement Competition for Professionals.
TUESDAY, November 7 12 NOON to 6 P.M. WEDNESDAY, November 8 10 A.M. to 5 P.M.	Fortnightly Show. Floral Arrangement Competition for Amateurs. *British National Carnation Society's Competition.*

Lectures

TUESDAY, October 10 at 3 P.M. "Outdoor Peach Growing" by MR. JUSTIN BROOKE.

TUESDAY, October 24 at 3 P.M. "Horticulture as a Career" by MR. F. A. SECRETT, C.B.E., F.L.S., V.M.H., and MR. J. L. RUSSELL.

TUESDAY, November 7 at 3 P.M. "Hardy Heaths" by MR. F. E. W. HANGER.

Colour Films—A remarkable set of films prepared by Shell Chemicals will be shown at 3 P.M. on Wednesday, October 11, 1950 in the Lecture Room, The New Hall. The films give in Technicolor the full life cycle of the Winter Moth, Red Spider and Raspberry Beetle.

Demonstrations at Wisley—The following demonstrations will

be given at Wisley, that on the second day being in each case a repetition of the demonstration given on the first:—

Flower and Vegetable Garden

October 4, 5. Digging, Trenching, Manuring and Composting. (2–4 P.M.)

Flower and Fruit Garden

November 1, 2. The planting of Fruit Trees and Roses. (2–4 P.M.)

Kindred Society's Show—The National Chrysanthemum Society are holding their late Show on October 31 and November 1 in the Society's New Hall. Fellows' tickets will not admit.

Mr. F. J. Chittenden—With deep regret we have to report the death of MR. F. J. CHITTENDEN, O.B.E., F.L.S., V.M.H., on August 1, 1950. MR. CHITTENDEN served the Society for many years, as Director of the Wisley Gardens and Editor of the JOURNAL, and later as Technical Adviser, Keeper of the Library and Editor of the Society's publications. Since his retirement he had been working on the Society's *Dictionary of Gardening*. A fuller notice will be published in next month's JOURNAL.

Editorial Assistant—The Society has a vacancy for an Editorial Assistant. Some knowledge of horticultural plants is necessary and experience of proof reading and book production is desirable. Candidates must have a good education equivalent or nearly equivalent to a University degree, preferably in Botany or allied subjects. All applications and requests for interviews should be addressed to the Secretary.

Publications—*Camellia and Magnolia Conference Report*. This contains the important papers read to the Conference in April 1950 by MR. G. H. JOHNSTONE, O.B.E., DR. H. HAROLD HUME, MR. H. G. HILLIER, MR. J. E. DANDY, MR. J. R. SEALY and MR. T. T. YÜ, together with the reports of the tour and show. This book includes the first published account of a number of interesting varieties of *Camellia reticulata* from Yunnan. It is illustrated both in colour and monochrome and should form an indispensable book for all interested in the two genera. Price 15*s*. postage 9*d*. U.S.A. 3 dollars, post free.

Fruit Year Book, 1950. This contains many important articles on aspects of fruit growing. A special section on fruit growing in Ireland is included. The section on diseases includes articles on the fruit tree Red Spider Mite and its control by DR. A. M. MASSEE, on the new phosphorus insecticides and on virus diseases of fruit trees in England. The discussions held by the Fruit Group are also included. Illustrated. Price 8*s*. 6*d*. postage 9*d*. All publications are obtainable from the Secretary.

Results of the Examination for the National Diploma in Horticulture—This is the most important of the examinations conducted by the Society and is intended for the professional horticulturist. Candidates for the examination must produce evidence of having followed the vocation of horticulture for specified periods; both the preliminary and final examinations involve practical tests conducted at Wisley or elsewhere, as well as written work. In 1950 there were 177 candidates for the Preliminary Examination of whom 28 acquitted themselves sufficiently well to be allowed to take the Final Examination in due course. At the Final Examination there were 58 candidates, 36 obtaining the N.D.H. in the various sections, as follows:—

Section I—*General Commercial Horticulture*

MR. ARTHUR T. PEARN
MR. ALFRED PLAYFORD

Section II—*Fruits in the open*

MR. PETER E. C. KNIVETT
MISS BARBARA A. RAKE
MR. FREDERICK H. OLVER
MR. JOHN D. WARE

Section V—*General Horticulture*

MR. THOMAS J. ALLEN
MR. JOHN G. S. MARSHALL
MR. RICHARD H. ANDREWS
MISS BEATRIX MOLESWORTH
MR. BERNARD T. BARRETT
MR. THOMAS MURPHY
MISS MARY E. M. BROOKE
MR. ROBERT G. NORMAN
MISS DORIS C. BROWN
MR. STANLEY PITTMAN
MR. RAYMOND H. BROWN
MR. BERNARD O'REILLY
MR. KENNETH A. FEATHERSTONE
MR. CHARLES D. REEKIE
MR. VICTOR L. FLAWN
MR. THOMAS M. SHEARER
MR. HAROLD L. FURZE
MR. ANDREW SNODDY
MR. OWEN G. GOODMAN
MR. HAROLD D. TINDALL
MR. JOSEPH A. GREEN
MISS DAPHNE VINCE
MR. CHARLES HATFIELD
MR. ARROLL L. WINNING
MISS MARJORIE E. K. INGRAM
MR. PHILIP L. D. WOOD

Section VIII—*Public parks, grounds and open spaces*

MR. HAROLD F. AUSTEN
MR. TONY C. GEACH
MR. GEOFFREY A. BURROW
MR. WILLIAM C. OLIVER

Gladiolus Thrips—The attention of Fellows is directed to the presence in this country of an American species of Thrips, *Taeniothrips simplex* Morison, on Gladiolus. Severe injury is produced by this pest both on the flowers which become discoloured and spotted and speedily wither and shrivel, and on the foliage which turns brown as though burned. The pest overwinters on stored corms, and further information will be given in the Society's JOURNAL. Plants suspected of being infested with this pest may be submitted for confirmation to The Director, R.H.S. Gardens, Wisley, Ripley, Woking, Surrey.

Royal Society of Arts 1951 Prize—We have been asked to draw the attention of Fellows to the following:

As part of the Society's celebrations of the centenary of the Great Exhibition of 1851, which it originated, and as a constructive effort to assist the nation in its present difficulties, the Council of the Royal Society of Arts propose to award on May 1, 1951, a Prize of a Gold Medal and a sum of £500 for an entirely new and outstanding contribution to the national economic recovery.

Holding the opinion that no line of economic development is of greater importance to this country at the present time than the improvement of its home food supplies, the Council have decided to offer the Prize for: A means of promoting the production or the economic utilization of food in Britain. The proposal may be quite general or may be concerned with any particular branch or aspect of food production.

Any correspondence on this subject should be addressed to The Secretary of the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2.

WISLEY IN OCTOBER

GARDENS which depend upon the ordinary run of herbaceous plants and flowering shrubs for their embellishment are apt to become very dull places by the time October arrives. By judicious selection of material, however, it should be possible in almost any garden to ensure the provision of flowers until the autumn is well advanced and coloured foliage and berries to enliven the borders well into the winter. Wisley is richly endowed with such plants, and in the brilliant, sunny days so often enjoyed during the latter half of October colouring in the Gardens can be as vivid and varied as at any time in the year.

The flowers that are to be seen depend even more at this season than usual on the weather, but if there are no very severe frosts the Dahlias and Michaelmas Daisies in the floral trial beds should still be colourful, while late flowering perennials such as *Physostegia virginiana* 'Vivid,' *Chrysanthemum rubellum* and varieties of Solidago and Aster help to prolong the display in the Herbaceous Borders. Likewise the Rose Borders and beds of Gazanias near the Alpine House will still be showing fine blooms. Near here autumnal flowering Crocuses will be thrusting delicate lavender, purple or rosy-lilac chalices above ground. Numbered among the species to be found are *C. speciosus*, *C. nudiflorus* and *C. zonatus*.

On entering the Gardens the visitor is greeted by the clear pink flowers of the Belladonna Lily and the deeper tones of *Nerine Bowdenii*. Further to the right are two species of Clerodendron, neither particularly showy but valued for their late flowering season. The first, *C. Bungei* (syn. *C. foetidum*) will, in favoured localities, form a rank growing shrub, but here it is usually killed to the ground, the young shoots springing up again to a height of three or four feet and blooming in the same season. *C. trichotomum* forms a small tree, now in the fruiting condition and very decorative, the shining prussian-blue berries subtended by spreading crimson calyces.

In Seven Acres a serene and truly autumnal picture is created when the sunlight gleams on the purple drifts of *Calluna vulgaris Alportii*, the misty-crimson Irish Heath lit by a few remaining flowers of the white variety and the mingled icing-sugar pink and rusty-brown of *Erica vagans grandiflora*. They form an island of colour surrounded by smooth green lawns backed by the varied golds and reds of Crab-apples, Barberries, Maples, Dogwoods and many more. Dominating the scene are two good specimens of *Salix alba vitellina pendula*, their foliage changing to a clear gold, while a nearby clump of Bullrushes or Reed-mace forms a pleasing contrast in both colour and form.

The Pinetum, too, looks very attractive at this season. The sombre hues of the Conifers seem to respond better to the softer sunlight than to the summer's glare and also form an admirable background for the deciduous trees and shrubs planted among them. Three species of Rhus make a notable contribution to the scene, the Shining Sumach, *Rhus copallina*, changing to deep purple, and *R. Toxicodendron*, the Poison Ivy, to a glowing scarlet. The Smoke-tree *R. Cotinus* (*Cotinus Coggygria*) changes to a sufficiently flaming colour to warrant the impression of smoke created by the feathery grey seed-heads. The

American *Aesculus parviflora* makes an admirable shrubby specimen plant in this type of situation or as ground cover in light woodland. It has feathery white panicles of flowers which appear in July and August and leaves which turn a clear golden yellow at this season. There are several Maples, notably a group of *Acer saccharinum laciniatum* having finely cut leaves, now pale yellow, with contrasting glaucous undersurfaces, on graceful pendulous branches.

The Azalea Garden is, for the second time during the year, a sea of glowing jewel-like colours changing from day to day, but in lower tones than in its spring burst of flowering. The Viburnums have been hung with scarlet or black fruits for some time and now their foliage is colouring as well. Among those outstanding are *V. foetidum rectangulatum*, *V. Opulus aureum*, *V. tomentosum Mariesii* and *V. alnifolium*.

On the rock bank at the end of the Award of Garden Merit Collection the buttercup-yellow Crocus-like flowers of *Sternbergia lutea* are appearing. *Prunus Sargenti* and *Euonymus alatus* alike are clothed in a mantle of cardinal red.

In the Wild Garden a thirty-foot specimen of *Oxydendron arboreum* is beginning to change from gold to scarlet and *Disanthus cercidifolius* has crimson leaves suffused with orange, shaped like those of the Judas-tree, which drop to reveal small crimson spider-like flowers borne back to back in two-flowered heads. Among the other shrubs noted for their foliage in autumn are *Fothergilla monticola*, now a sheet of brilliant yellow and orange, and the species of Enkianthus especially *E. perulatus*, which flowered so well this spring. There are patches of the pretty *Cyclamen neapolitanum*, most of the flowers of which are over, but the marbled leaves are most attractive now that they are fully expanded and in a like manner are carpeting the ground beneath the Japanese Maples in the Alpine Meadow. These Maples, pleasantly coloured during the summer, are now displaying dazzling shades of scarlet, bronze and gold.

On the Rock Garden most of the alpines except *Polygonum affine*, *P. vaccinifolium*, and a few late flowers of Gentian and *Verbena chamaedryfolia* have faded, but *Fuchsia magellanica discolor* is still blooming and the creamy-white heads of *Saxifraga Fortunei* are mingling at the water's edge with the heavy yellow-green plumes of the Royal Fern.

In the Stove House there are many decorative foliage plants and Orchids, while the Temperate House is gay with a variety of plants such as *Tibouchina semidecandra*, *Cassia corymbosa* and the first white flowers of *Camellia Sasanqua fragrans*. The side staging is bright with Pelargoniums, Nerines and Begonias. A collection of succulent plants will be of interest to many especially now that Faucarias and other genera are coming into flower. In the middle bed are the scented blooms of *Rhododendron mucronatum* and *Luculia gratissima*, as well perhaps as the first flowers of *Acacia platyptera*.

The Abutilons have been blooming for some months in the Half-Hardy House, joined by the blue flowers of *Lithospermum rosmarinifolium* and *Aster Pappei*. Among the bulbous plants are Nerines and Zephyranthes, while trained along the roof supports *Solanum jasminoides* and a small-flowered yellow Clematis, *C. nannophylla*, continue to flower.

THE HYBRIDIZING OF LILIES
AN AMATEUR'S APPROACH

O. E. P. Wyatt

(*Lecture given on June* 27, 1950, COL. F. C. STERN, F.L.S., V.M.H., *in the Chair*)

I WISH at the outset of my talk to emphasize my inexperience; in comparison with the experiments of others, not only in this country but in America, Canada and New Zealand, my own have been made on a very small scale. When reading through the learned and substantial lectures given to you in the past, I am uncomfortably aware of my amateur status and of my lack of qualification to address you.

I suppose that it is a spirit of adventure which prompts an amateur to try his luck in hybridizing Lilies; he wishes to raise a "new" Lily. He is by no means unconscious of the beauties of those species with which Nature has adorned various corners of the Northern Hemisphere and which Man has transplanted to his gardens with varying degrees of success.

He knows also the best hybrids, such as *testaceum*, *aurelianense*, 'Shuksan,' and he has heard of the great hybrids of the past, even though he has never seen them, and they seem to cry out to him from the bonfire—not we hope from the compost heap!—to raise strains which will emulate their glory; these must be such as will live and live vigorously. He must not be thwarted by those who say that no hybrid yet produced has rivalled the beauty of Nature's handiwork; it may or may not be true, but is irrelevant for his purposes. For most of the species have much too precarious a hold on life in English gardens, and hybrids must be bred which have good constitutions, which are not temperamental, and which are not easily killed by disease, besides being as beautiful as possible. We want tough Lilies—and that is to be the main theme of my lecture. And I believe it can be done. Superior and disease-resistant strains have been produced in other vegetables, crops and flowers. Potatoes and Wheat are perhaps outstanding examples. Why not in Lilies? We are at the beginning of Lily hybridization and it will take many generations of hybridizing to produce superior strains, but unless it is done Lilies can never become "popular" plants for the ordinary garden. Yet that is the vision: to every garden its own Lily bed!

What qualities should we then expect of our superior strain? Beautiful in their colours and shape (but not necessarily large) and lush in foliage; hardy in constitution; resistant to disease; sweet smelling; self-supporting—able to stand up on their own without continual staking and tying; easy to reproduce vegetatively; and I understand that in the course of time it should be possible also to produce hybrids which come true from seed.

Let us consider some of the qualities in greater detail.

COLOUR AND SHAPE

One must have foresight in deciding what crosses to attempt. Like most amateurs I started by hybridizing indiscriminately, by going out into the garden and cross-pollinating any two Lilies which happened to be out. As an example, I crossed the true *L. Roezlii* with *L. Parryi*—and I got what I deserved. Each parent is beautiful in its own particular way, but the hybrids, which are all very similar, show the worst features of each parent: the uneven raggedness of the flower of *L. Parryi* and the rather weak colour of *L. Roezlii*. In my opinion, some of the *Hansonii* and Pink Martagon crosses are open to the same objection; the colour is washy or at best is a displeasing mixture of pink and yellow, even though they seem to be more resistant to disease than many others and are easily reproduced vegetatively. I do not really feel great enthusiasm even for *L.* × 'Dalhansonii' since the red and orange are inartistically blended. I raised a seedling myself from *L.* × 'Dalhansonii' (cross-pollinated back again with *L. Hansonii*) which shows more orange colour and cheers the flower up a little perhaps, but it is not a Lily which has exceptional appeal for me, though it is a very strong grower and satisfies many of the other qualities of a superior strain.

But I am beginning to learn a little wisdom; last year I crossed *L. fresnense* with *L. Parryi* and *L.* × 'Shuksan' with *L. Parryi*, and both in colour and shape the resulting seedlings should be attractive. There are hundreds of seedlings of each of these. One must try to visualize the possible appearance of the crosses one makes and I instance these as illustrations of improvement in my taste and forethought. (Incidentally, *L. fresnense* puzzled me for some years when it was considered to be a variety of *L. nevadense*. It bears little resemblance to it; I have several times raised it from seed and it invariably comes true. I am glad to see therefore that in the new book, ***Lilies of the World***, it has been raised to specific rank.)

HARDINESS OF CONSTITUTION

If the parents are hardy, the hybrids should be hardy. I raise almost all my hybrids in an open frame, under a wall facing north, on which the lights are put on only in heavy rain or snow—and I live in Northamptonshire, which has not a particularly mild climate. They have to put up with any amount of frost and so far as I know I have never lost a seedling from cold. I have almost a fetish about this; I cannot speak scientifically, but I firmly believe that if everyone would courageously raise their Lilies in the open, we should in the course of time have much hardier stocks and should lose fewer Lilies through "lack of constitution," though I am aware that this may present difficulties in the hotter parts of the country. Apart from all else, seeds and seedlings in the open need much less attention: an occasional watering and a little weeding is all they get from me. Needless to say, I should not attempt this treatment for seeds of the first generation from Lilies which were not themselves hardy; but I see no reason why subsequent generations should not be selected gradually for hardiness. I believe that in America a hardy strain of *L. sulphureum* has been raised in this way.

I do not find *L.* × 'Pride of Charlotte' at all a good doer with me, and it lacks constitution (perhaps because of too much vegetative propagation by bulbils). Therefore I have crossed it with its close relation—MR. BOWLES'S *L.* × 'Princeps,' which fares very well; the seeds have germinated well and I hope to produce from them a Lily which has the charm of *L.* × 'Pride of Charlotte' and the toughness of *L.* 'Princeps.' This, I believe, is the right method of procedure in order to strengthen constitution. It will be interesting too to see whether the strain produces bulbils (as both parents do) and whether bulbs grown from them will endure better than does *L.* × 'Pride of Charlotte' even though reproduced vegetatively.

I have brought up to show you an attractive hybrid between *L. Martagon album* and the difficult *L. Kelloggii*: its flowers are very similar to the latter but it may prove to have the constitution of a Martagon.

RESISTANCE TO DISEASE

Similarly it may be true that Lilies grown thus toughly may prove to be less prone to disease. Of course one should use as parents one's most vigorous specimens and this is likely to be an important factor also in eliminating disease. But in general the production of disease-proof Lilies is a long-term policy, requiring much more than one man's life-time. In choosing hybrids for further crossing the first consideration should be resistance to disease; this should take priority even over colour, shape, size, height and every other desirable characteristic, however much heart-burning it may cause.

Seeing what losses in Lilies were caused by neglect in wartime it is obvious that most Lilies are too pampered, and one of the first aims of the hybridizer is to produce strains which will be less dependent for survival on human agency. Spraying and dusting may be necessary evils, but they must be considered as transitory evils; the ultimate hybrids must be able to hold their own without help whatever the wind may bring or aphis inject.

SELF-SUPPORTING

The acquisition of this desirable attribute runs the risk of excluding from hybridization some of the most beautiful Lilies—e.g. *L. Davidi* var. *Willmottiae* and *L. Wardii*. I have raised one quite good hybrid from crossing a Scottiae hybrid back to *L. Willmottiae* which is good except for the characteristic obtained from its father of inability to stand upright soberly. It has the great merit of being one of the first Lilies to bloom each year. I call it 'Jock Scott.'

But the staking of Lilies takes much time, and one of the characteristics of a good Lily is that it stands up well. Incidentally I have found dead branches of bamboo (Phyllostachys) with the side shoots trimmed a most excellent means of support. The Lilies need no tying; the support can be put in as soon as the Lily appears above ground, and the flowers of the Lily hang over it in a natural way.

SCENT

Do not let us fall into the besetting sin of the last generation of Rose hybridizers and forget scent! Personally I have never tried to hybridize *L. pyrenaicum* with any other for this reason only and I advise you to shun it also. There is little doubt that some of the hybrids produced from Lilies with a pleasing smell will be sweeter than others—if so choose the scented form if you can. To the townsman the scent of Lilies is associated with funerals; to us who are Lily worshippers it is associated with the happiest of horticultural joys. Scent therefore is of importance and must not be neglected, even if it has not the foremost claim on our attention.

Finally, in connection with choosing the victims for one's experiments, it is important to be able to make a guess at the possibility of success. I understand that in this matter the scientists cannot help us much, since almost all Lilies are diploids, even though one or two have some fag-ends of chromosomes thrown in just to make their sexual behaviour a bit unpredictable. But this does not get us far; for we all know how impossible to effect some crosses seem to be. I always think that the best "amateur approach" is to consider the bulbs; if the bulbs of two prospective parents are similar in structure and habit, a cross-pollination is likely to be effective. For instance, you will not easily make a cross between *L. regale* and *L. Parryi* because the nature of their bulbs is so different. For years I have tried to cross *L. Martagon Cattaniae* with *L. Duchartrei Farreri* but it has never succeeded, and my intuition should have forewarned me of failure since their bulbs are so dissimilar. However, there may be no scientific basis for this and there are probably many exceptions. I have often been told that MAX LEICHTLIN used to say that Lilies from one part of the world are likely to cross with Lilies from the same part. Perhaps he was saying the same thing as I am from another point of view; for it is roughly true to say that many of the American Lilies have similar bulb structure to one another, so do many of the Chinese and so do many European.

A gardening friend, whose opinion is respected by all of us, has suggested to me too that it is useless to put pollen from a Lily with a short style on to one with a long style in case its pollen is only meant to have a short tube which would not reach far enough on a long style to reach the ovary. That also appears to me to be an interesting approach to the matter.

But whether by guess or judgment, during winter evenings in the dreamland of paragon Lilies, the amateur decides what crosses to attempt and sets out in his garden on a sunny mid-day in summer; if he is wise he will have previously removed the anthers from the prospective seed parents before the flower opens. Personally I do not bother to do this in cases where she is unlikely to set seed without my help, e.g. *L.* × *testaceum*. I have no claim to originality in my procedure; I do it rather drastically, carrying, in my fingers, pollen-bearing anthers or a whole flower to the bride. Camel-hair brushes, rabbits' tails, tin boxes, tweezers and wood alcohol form no part of my equipment. Doubtless they will do so when I cease to be a beginner! I was much interested to read in the last Year Book that pollen can be preserved for many months;

clearly I have a great deal to learn. I pollinate each of the flowers concerned two or three times in a week and cover the whole of the stigma thickly: I am told that this is quite wrong, but it seems to meet with success. Apart from all else it appears to me to make it difficult for bees or other helpers to spoil my work by bringing some other unwanted pollen; I get in first and my chosen pollen is so thickly laid on that no other can reach the stigma. With some fear of contempt on the part of the professionals amongst you I confess that I do not cover the Lily subsequently with a muslin bag.

But I am at least sufficiently methodical to label carefully every flower pollinated. One soon learns how unreliable one's own memory is and how difficult is identification of an individual seed pod in the space of a few months.

When the seed case is on the point of splitting in the autumn I gather the capsules, store them in envelopes in a sunny window, shake them out as soon as they are dry, store the seeds again for ten days or so in envelopes in the sunny window, giving them a shake every day or two to ensure ventilation, and then sow them at once. I am always ready to learn, and I am hoping to be told how my plan of campaign may be modified or improved. My emphasis on "envelopes" is that I believe the rays even of an autumn sun may scorch unprotected seed; and my reason for planting them at once is not only that most seeds seem to germinate more quickly if freshly sown, but also because I have found that seeds often become too damp or too dry during the winter unless stored under ideal conditions. Even with those seeds whose germination is hypogeal there is nothing to lose by immediate sowing.

The seedlings remain in an open frame for eighteen months; less in the case of some species, and occasionally more. But my second great fetish is to get the seedlings into their permanent positions in the garden as soon as I can. Search as you will in the textbooks and Year Books, and you will find little agreement on this point—the correct time at which to move seedlings or bulbs from scales to their permanent quarters. Last autumn we had an interesting discussion on the matter at a Group Meeting up here and divergent views were expressed; but amateurs would do well to remember that the nurserymen's problem differs from ours: their bulbs must be moved again, ours need not be, and I personally believe that the sooner their roots are allowed to develop permanently the better will they thrive. When moved young, their roots are small and only carelessness will break them. Out of 380 bulbs grown from scales of my American Lily hybrids taken in the autumn of 1948 and planted in permanent positions in May 1949 only 19 have failed to come up this year; in spite of the 1949 drought I did not once water them after they were first planted. A few of them are actually flowering this year. Greedy slugs or wireworm can be held responsible for a 5 per cent. loss, and I am grateful to them for controlling their appetites with such kindly restraint. However, I am not always so fortunate; this year, heavy rain, frosts, cold winds, heat wave and drought in quick succession have caused a sharp rise in the rate of infant mortality.

But I am wandering from my subject.

In the course of time, after some years of hybridizing, with many

failures and some successes, an amateur is faced with the big problem of the number of seedlings which he has on his hands. In the first generation he may have produced some good hybrids; some may appear strong in constitution and free from disease, others of attractive colour or shape; but he cannot stop there. He must cross-pollinate again or pollinate back to or from the original parents, or still better to other stocks of the same species, if he is to produce a really fine constant strain. Then, if he is a successful hybridizer, he will have thousands of seedlings needing attention; unless he has unlimited time himself or a very large purse the task is likely to be beyond him; for even in a reasonably large garden there is some limit to the number of Lilies which can be grown in suitable sites. Thus, he will come to the conclusion reluctantly that he must limit his activities to one or two selected strains, especially if he has reason to think that no-one else has been successful with them. I have not dabbled in the hybrids of *L.* × ***aurelianense*** because others are doing it with outstanding results: I leave it to them.

Take, for instance, the ***testaceum-chalcedonicum*** group. In this I have had some success in hybridizing these two in the first generation after many years of attempt, and four of them have flowered. I have been able to show three of them up here and I am hoping some time to show the fourth, which, in my opinion, is the best of them all. I have raised a certain number by scales from these, and a point of interest is that all the young bulbs of two of them, planted in the open, had young leaves above ground at Christmas time. It would seem that they have inherited from their grandparent, *L.* ***candidum***, a tendency to be evergreen. Fourteen degrees of frost this winter did not seem to perturb them at all; the young leaves were unaffected. But they are slow growers.

I understand that breeders in America and New Zealand are also on the move in developing these. (In passing may I say how much I appreciated the wonderfully interesting article in the 1949 Year Book on hybridizing in New Zealand.) Last year I hybridized these four back to their ancestors and vice versa: ***testaceum***, ***chalcedonicum*** and ***candidum***; and I have now 400 seedlings from the various crosses. There should be some good things amongst them and I can probably deal with that number. The seeds were sown in October, and the seedlings were beginning to show above ground on March 1 this year—in an open frame, which, as you will remember, is at the foot of a north wall.

But however well they flourish, I have no right to expect that our "paragon" Lilies will appear for several generations yet, and by about 1955, when these will have flowered and been cross-pollinated, the task will clearly be beyond me, let alone subsequent generations. I am learning that, to be done effectively, Lily hybridizing must be carried out on a very large scale.

Suppose that in 1953 or 1954 I have in flower 100 of these seedlings, I shall try to pick out a certain number which are of good constitution, free from disease, whose flowers are good in colour and shape; then if I have the courage I shall eliminate from these any which are scentless or do not stand up well. If I am lucky I shall hope to have perhaps 10 which can pass all these tests. Then they must each be scaled and the

scaled bulbs tried out in normal, or even poor, horticultural conditions in order to prove themselves; for I never feel really happy with a Lily unless I can reproduce it from scales and be sure that it will grow in an average environment. At the same time some of the flowers must be re-pollinated with other stocks of their ancestry; some possibly with *L. Henryi*, which appears to be so good a pollen-parent, or with other species. And so the process should go on.

Personally I am sure that there is a great future for the hybrid Lily and we have as yet only touched the fringe of the possibilities; we all take too short a view and expect to produce in one generation or one man's lifetime, what can only be expected to appear in several generations of hybrids and in two or three human lifetimes. Perhaps the Lily Group will at some time consider the possibility of taking over the later stages of experiment of hybrids which are proving worthy; for a range of perfect hybrids may be beyond the power and span of an individual amateur.

Before I leave the *chalcedonicum-testaceum* hybrids, there are two or three further points of interest to note.

The original cross is the stumbling block. For years I tried to cross *L.* × *testaceum* with *L. chalcedonicum maculatum* and vice versa. Several times the pollinated *L. testaceum* set seed, but usually it did not germinate, or if it did the stray seedlings perished in infancy. I have one more seedling growing from 1948, which is apparently flourishing; but from crossing last year (a bumper year for Lily seeds I found) five only have germinated, whereas the hybrids crossed back with their parents produced abundant fertile seed. When the hybrids were crossed with one another, no seed pods set at all.

The group of *L.* × *testaceum*, with which the successful cross was made, has an interesting history. I bought three bulbs many years ago and they were the first Lilies I had ever possessed. Through ignorance or ill-luck or mismanagement, they failed to grow; I put a garden fork under them and the bulbs fell to bits. I left the scales scattered about the ground, and my surprise was considerable when next year three baby Lilies grew on the site! In those days I had never heard of growing Lilies from scales. I did not move them and there they are now on the same spot and for years they have flowered with great vigour. They are generally more than 7 feet in height and have borne as many as 13 flowers on one stem. From such a haphazard start in life, nearly resulting in infant mortality, these have been the seed parents of the hybrids which we have been considering. The moral to be drawn, one would say, is not merely to plant out baby bulbs in their final site but even the scales! But I do not make this as a serious proposal—yet!

Finally, may I deal briefly with two other crosses which I have made and which have a promising future? I have exhibited in the last two years some first generation hybrids from a cross between *L. nevadense* and *L. Parryi*, and they seem to have been received warmly by those who have seen them. (Fig. 197.) There are fifteen of them, which seemed to me to be good enough to name, and almost every one had some attractive feature about it; they are mostly vigorous, easily scaled and are an attractive sight in flower amongst *Impatiens Noli-me-tangere*, which

seeds itself around them each year. But the most interesting feature is their diversity; at the paternal end of the group is a hybrid almost indistinguishable from *L. Parryi*, and at the maternal end almost an exact replica of *L. nevadense*. Twelve Lilies between them can be lined up at sight ranging gradually from one parent to the other, both in flower and leaf, leaving number fifteen out of the picture, for it has a curious well-formed brownish flower unlike either parent. If only they would all flower together (which they do not do), they would make a remarkable exhibit. Five of them should certainly be crossed with one of their parents; or possibly a cross with some other species would be preferable since both parents have a regrettable tendency to be ragged. Alas, owing to the claims of the Lily Show, they were not available for hybridizing last year, and I have not yet begun to raise a second generation. I have, however, made again the original cross between *L. nevadense* and *L. Parryi* and have distributed some of the seed to those who might like to join with me in raising seedlings from it. You will have noticed how valuable I have found the pollen of *L. Parryi*, which I find an excellent parent. *L. Parryi* itself grows well with me in spite of the presence of enough lime in my soil to turn any Rhododendron yellow in a year.

Whether I have time and space to proceed as thoroughly as I should in developing this group of hybrids by crossing back and crossing with kindred species seems doubtful. I believe it has great possibilities.

And lastly there was a cross between *L.* × 'Shuksan' and *L.* × 'Burbankii'—not that I know what *L.* × 'Burbankii' is; nor does anyone else, since it is an omnibus name for a whole group of hybrids, and I have two or three forms in my garden. But these germinated in scores, and after planting a certain number in well-prepared ground, I planted others in out-of-the-way parts of the garden and threw the rest away in despair. But when these which were luckily placed had bloomed and had shown real quality, I collected the survivors and gave them worthy homes. They are a most vigorous race; every tiny scale broken off produces a bulb—some of which have flowered in twenty-two months from autumn scaling. Lily enthusiasts who have seen them have expressed delight with them. Some are bright red in colour, some orange, some brown, some buff; most are fairly heavily spotted. Some have attractively pointed petals with pink tips which give them a debonair appearance. In the second year of flowering some of them had twenty or more flowers on a stem, but in the third year many deteriorated because I had planted them too closely and they needed division. More important still, they seem to be free from disease so far. I have scaled some of the best of them and have planted the resulting bulbs in groups in which I think they will show off their individual characteristics to good effect; when planted together in their original site with their fellow hybrids their individual features tend to be blurred. (Fig. 198.)

Now these are several generations removed from the original species, and they seem to lend support to my belief that if we go on hybridizing long enough we shall produce hybrids which for various reasons will thrive more vigorously in English gardens than do the species. They have in their ancestry *L. pardalinum*, *Humboldtii* and *Parryi*.

I am conscious that I have had beginner's luck as a grower of Lilies. I do not think that my soil is particularly suitable; almost all of it contains lime; much of it has heavy clay beneath it though some is sandy. But even clay is not without its value; in some places I have dug down to four feet and got through clay and into sand in the centre of my Lily bed, put in a clinker sump and shaped the clay on the rest of the bed to drain down to it. Lilies grow very well in such places; the ground never becomes stagnant, and yet the clay ensures that it never dries out.

But again I am digressing and I must not venture in a discussion on soils or planting. But such success as I have achieved in growing hybrid Lilies, I believe, must be attributed to three main factors:

Firstly, deep cultivation of the beds in which they are planted; spend 5*s.* on a Lily and £1 worth of labour in making a home for it.

Secondly, refusal to pamper the seeds and seedlings. Do not coddle them; grow them in the open and protect them only from heavy rain. If they are weaklings, the sooner something kills them the better; for if they survive, they will only waste your time. It was the lecture of MR. G. M. TAYLOR in 1932 which guided my steps in this direction, and I acknowledge my debt to him.

Thirdly, removal of the seedlings (or bulbs from scales) to their final home as soon as ever they can be handled. When young, the whole root can be removed unbroken; make a hole with a trowel, form an apex inside the hole and spread out the baby roots down the sides of the apex. Down the roots will go and in a few weeks they will be inches deep, oblivious to drought, and will race away to the flowering stage without further help from man.

Perhaps as a result of my talk other amateurs will think it worth while to try my "tough" methods. If so, all they need is a small plot of ground and plenty of patience, and their reward will be much happiness and adventure in the Elysian fields of Lily hybridizing.

SHOW AURICULAS

THE EDGED VARIETIES OF THE FLORISTS

George M. Taylor

THE old "edged" Auriculas so popular with the enthusiastic artisan florists two centuries ago, are a most remarkable development of this particular genus of hardy alpine plants, and in this group the formality of the flowers together with their unusual colour schemes reaches an extreme limit. One of the most pleasing features is the farina or meal so liberally bestowed on leaves and stems, and always in the centre of the flowers. The plants, indeed, when in flower are literally a symphony in silver, and even to-day they are the most appreciated of all the Auriculas.

The Show Auricula has been in cultivation for many years and the literature in connection with it is extensive but actually provides very little information about its origin and main lines of development. There is plenty of detail regarding the weird composts for growing plants, and

ample descriptions of varieties. GERARD cultivated the Auricula in 1597, under the name of 'bears' ears' or 'mountain cowslips,' and one of the first records regarding it is due to CLUSIUS who, in 1598, noted plants growing in a garden in Vienna and learnt that they were natives of the Alps. Tradition has it that they were introduced into this country even earlier than GERARD's day, and it is thought that they were brought here by Flemish weavers driven from their homes by persecution, and the fact that GERARD grew plants would seem to confirm this. CLUSIUS records but one form in his *Herbal*, and it would seem to be *Primula Auricula* itself and no mention is made of its vari-coloured hybrid decendants. From the days of CLUSIUS and GERARD onwards there are records, many of them in considerable detail, which prove the existence of a number of very distinct forms, but it was not until the later half of the nineteenth century that KERNER demonstrated the starting point of the garden Auricula, and that it was to be found in the natural crosses which occur in the alps where *P. Auricula* and *P. hirsuta* happen to be growing together.

A study of Auriculas indicates that a number of mutations has been detailed, showing clearly that they are particularly subject to these spontaneous "breaks." One has only to look at cultivated plants to note how markedly they resemble one of their parents, *P. Auricula*, which in the wild state has given rise to a notable series of subspecies and forms, many of whose distinctive features can be recognized in it, sometimes quite definitely, sometimes only vaguely. On the other hand the more stable *P. hirsuta* seems to have been responsible for the anthocyanin colours of the flowers and the bright green foliage of the Alpine and green-edged Auriculas. The foliage of *P. hirsuta* varies but little; it is entirely devoid of meal; the leaf edges bear small glandular hairs and the colour is a distinctive vivid green. The foliage character of *P. Auricula* is somewhat more complicated. This species is an aggregate made up of a number of subspecies and forms. The type *P. Auricula* is mealy, but the subspecies *P. Auricula ciliata* is completely free from meal even at the base of the calyx.

In the type *P. Auricula* the foliage may carry anything from the merest suspicion of powderings to a layer of farina which is actually so intense that it flicks off in patches. This matches the grey and white-edged forms, for these do not form two precise groups as indicated in the classification of the florists, but are a continuous series beginning with forms having so little meal that they appear to be green-edged and ending with forms which are so covered with meal that they could well be described as "encrusted."

In *P. Auricula Bauhini* (including *P. A. albocincta* and *P. marginata* of catalogues) we have still another meal-bearing subspecies. Here the degree of mealiness is somewhat variable, but the main characteristic is that the meal forms a very dense coating on the margins of the leaves, so giving them a decided clean cut silvery edge. This can be noted in the foliage of many Auriculas, and in the petal-leaves it has actually provided the starting point of the only grey-edged forms that were tolerable on the show bench, that is those in which a distinct margin of silvery white bounds a zone of greenish grey.

It would seem that the edged forms have arisen from mutations amongst the species, subspecies and their hybrids already noted, and it is now clear that the faculty of mutating in different directions must have been carried by the first of the natural hybrids imported into this country. These mutations, step by step, provided a number of new and extraordinarily distinctive features which were at once noted by the keen old-world florists, and they segregated them, developed them, and in due course they furnished the bases of the edged flowers as we know them to-day.

The edged group is divided into three sections. These are green-grey or white-edged flowers, and between the edge and the paste there is a band of colour. This is called the "body" colour. The type of flower preferred by the florists was one in which the body colour is of an intense black, but the colour range is actually a wide one. This is particularly the case with the selfs, a group now bracketed with the Show Auriculas. This group is characterized by the fact that the throat of the flower is circled by a clean cut ring of intensely white "paste." The colour range in the selfs is wider than that of the Alpine Auriculas, and the opinion has been expressed that it is questionable whether any other flower in cultivation can show such a diverse series of colours.

The old florists were very particular about the standard set for the flowers. They had four distinct qualifications for the edged varieties, and unless these were embodied in the flower it was rejected as useless for show purposes. These qualities were, first, the eye or tube, which should have the stamens lying in it, but sometimes has the pin-headed stigma instead, which is a defect; second, the paste or circle of pure white surrounding the eye; third, the body colour, a circle of some dark tint, as maroon or violet, which feathers out more or less towards the edge, but is the more perfect the less it is so feathered, and is quite faulty if it breaks through to the outer edge; fourth, the margin, which is green or grey or white. These circles should be about equal in width and clearly defined, and the nearer they are to this standard the more perfect is the flower. The photograph (Fig. 201) shows a white-edged seedling raised by me, and I think the flower would have satisfied the most critical of the old florists. Fig. 202 shows two typical Alpine varieties for the sake of comparison. They are only young offsets flowering for the first time.

The nature of the Show Auriculas has long been a matter of speculation, but an examination of the corolla of any of the edged varieties will show that the structure is identical with that of a true foliage leaf. These edges, without any possibility of doubt, are actually leaf structures, and the flowers are examples of virescence, frondescence or phyllody. Although this phenomenon is rare amongst garden plants it is common amongst wildings. We have, for example, the green Primrose, and there is a double form although I have never heard of it being found wild. There is, too, a double green Auricula. It was thought to be lost, but I have obtained it from an old garden in Ireland.

The cultivation of the Show Auricula is really a very simple matter, but in its halcyon days when enthusiasm for the flower was at fever-heat in the eighteenth century and the first half of last century, the recipes for

potting composts were formidable in the extreme, and some disgusting mixtures were recommended by expert growers. Dreadful examples are given in the books of such writers as JAMES JUSTICE (1754), JAMES MADDOCK (1792), WALTER NICOL (1798), THOMAS HOGG (1812), and ISAAC EMMERTON (1816), all of whom were keen growers. HOGG, however, writing in his book *A Concise and Practical Treatise on the Growth and Culture of the Carnation, Pink, Auricula, Polyanthus, Ranunculus, Tulip, etc.*, states that—"the different composts used by florists in growing this flower are almost as numerous as the florists themselves," and remarks "Persons often take extraordinary pains, and much unnecessary expense, to injure, if not destroy, their flowers. Weak minds are soon misled by quackery and novelty, having no sound judgement of their own ; and quackery, even in the growing of flowers, has as many followers as in any other line." There can be no doubt whatever that the using of such loathsome mixtures for the growing of Show Auriculas had the effect of sickening the plants and in consequence there were many losses, and these lovely things were looked upon as miffy subjects and difficult to grow. There is a vast literature on the subject, and I have carefully gone over most of it. After reading it I am not astonished that the "dark age" set in for Show Auriculas. The day of empiricisms in the growing of these flowers is, happily ended.

The best compost for potting is made up of three parts good fibrous loam, two parts thoroughly decayed leaf mould, and one part of sharp sand. I have never had any trouble with my plants when grown in that mixture. The matter of a suitable size of pot is important. They should never be grown in large pots, and a 4½-inch pot is quite large enough. Potting should be done in July, and any offsets can be propagated by removing them in that month, and potting into small sixties.

Auriculas are sometimes attacked by greenfly, and if that happens a spraying with a good nicotine insecticide will prove effective. The most serious pest is Woolly Aphis. This puts in an appearance at the end of June and continues throughout the summer. It is generally observed round the collars of the plants just at soil level. It can be quickly eradicated by dabbing methylated spirits with a brush over the affected parts, but care must be taken to use sparingly. This pest also attacks the roots of the plants, but only where they have access to air, generally round the inside of the pot.

Show Auriculas are very hardy and are most impatient of heat. They must not be grown entirely in the open as exposure to rain, especially heavy April showers, causes the white paste to run, completely spoiling the exotic beauty of the flowers. I only keep my plants in the open during July and August, and they are then transferred to a cold frame to winter and to flower in spring. The frame is in a position that is only in sunshine until mid-day, after which it is in shade. During the winter months the plants are kept very dry, and water is not applied until the beginning of March. The plants love a cool soil and shady situation.

Seed is very difficult to obtain as the flowers produce pollen very sparingly. I generally manage to obtain a little seed and have raised a number of seedlings from green-grey and white-edged flowers. I sow the seed so soon as it is ripe, and this must be very carefully done and

must be sown evenly on a level surface of fine sandy loam, preferably in a pan, and very slightly covered with fine soil. If the seed is sown deeply it will not germinate. The best seedlings are exceedingly weak, and all such should be very carefully tended.

The Auricula has been an inmate of British gardens for over three hundred years, and the Show varieties are still greatly prized by those who know them as one of the choicest flowers. Two hundred years ago they were objects of enthusiastic admiration by the old artisan florists, and were cultivated extensively by the operative manufacturers and artisans near Manchester, Paisley and other large towns. Like the Tulip, Pink, etc., it was essentially a poor man's flower, and as JOHN CLAUDIUS LOUDON put it—"a fine blow is rarely to be seen in the gardens of the nobility and gentry." The small space required for their cultivation was convenient for many folks of limited means like the old artisans, and as the Auricula is capable of withstanding the smoky atmosphere of towns, it became a favourite with those whose garden accommodation only extended to their window-sills or even the leads on the top of their houses. The old Lancashire growers had no frames or lights, but used weather boarding fixed against some wall or fence to defend their plants against rain or snow. They had many losses, but these were mainly due to the dreadful soil mixtures they employed for potting. Those old nostrums are now exploded, and the more rational treatment which has taken their place enables us to grow healthy and vigorous plants.

PLANT REACTIONS TO CHEMICAL AND PHYSICAL CHANGES

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IN 1918 Kraus and Kraybill described the significance of the carbohydrate to nitrogen relation in Tomato plants. When the carbohydrate to nitrogen ratio is very high, the limited amount of nitrogen curtails the synthesis of protein. A high carbohydrate to nitrogen ratio, where ample nitrogen is available but carbohydrates in soluble and storage forms are in excess, results in abundant fruiting. A plant in low ratio, with abundant nitrogen and carbohydrates, but where photosynthesis cannot produce carbohydrates in excess for metabolism and storage, responds with an active vegetative growth. There is no reproductive response at this nutritional level. This principle applies to the majority of plant species, including cacti and other succulents, and is vital in a growing programme where quality production is the goal. Naturally, in a low carbohydrate to nitrogen ratio, where the supply of materials is insufficient for adequate assimilation, the plant is in distress because of starvation, and responds with a frail vegetative growth.

In nature there is a balance between the root and shoot systems whereby the plant is kept in a nutritional balance conducive to maximum seed or fruit production. Quality is sacrificed for quantity

inasmuch as the principal objective is reproduction. Small seeds or fruits in very large numbers offer a better chance for survival than a few specimen products. This is natural economy. The ratio of root and shoot systems essential for proper balance through the life-cycle of a plant will vary with its habitat. In the desert, Cacti and other xerophytes, because of the scarcity of food and water, may develop a huge root system strikingly out of proportion to its shoot. HASELTON (1) has recently described and illustrated such an unusual relationship. A Cactus (*Opuntia echinocarpa*), less than 2 feet tall and 1½ inches in diameter, developed primary roots over 35 feet long and this definitely only represented a small fraction of the secondary root system.

In cultivation, our objective is to produce plants and blooms of unusual quality and colour. In order to obtain a high but adequate carbohydrate to nitrogen ratio, we disturb the natural balance with its tendency to quantity production to one that is qualitative in character. This, in part, is accomplished by pruning the plant whereby photosynthetic production is reduced, without changing the nitrate absorption by the roots. Complete fertilizers or nitrates, according to needs, are also used in maintaining such a balance. The pruning must not be too severe, as it is desirable to have carbohydrate production sufficiently in excess to allow storage. In late summer, nitrogen should not be dominant in the culture of tuberous plants, as they must store food for the next generation. A chemical imbalance would produce inferior tubers. They should be grown until the tops are killed by frost so as to allow the maximum food accumulation.

In our greenhouses, our Chrysanthemum plants (and others) are pinched, pruned and disbudded to maintain these particular ratios. The blooms and colour of plants so treated are decidedly superior. This disturbance of natural growth has its limit of toleration. If the nitrate level is made very high in proportion to the carbohydrate content of the plant, it will respond with protein production for assimilation into protoplasm, as is evidenced by heavy top growth. Such an imbalance makes food storage impossible. I believe such a condition is frequently responsible for small inferior types of bloom or blind growth, depending on the degree of imbalance to the plant.

The life-cycle of blooming plants is so short that there is never complete recovery from any setback. In pricking off seedlings, even with the best technique, there is a shock of transplantation that takes its toll. Last August (1949) we planted stocks in two 75-foot benches in our greenhouses. In one bench, the seeds were sown in rows and later the plants were thinned out for proper separation. In the other bench, the seedlings pricked out from flats were planted. All seeds were sown on the same day. Soil and other factors were identical in both benches. The direct sowing showed superior growth, bloomed ten to fourteen days earlier, and with bloom spikes about twice the average length of those from the pricked out plants.

It appears that the root damage caused by transplanting, so interfered with absorption as to produce, among other things, a low nitrate to carbohydrate ratio. It probably required ten to fourteen days for the plants to recover from this traumatic shock and imbalance. This damage,

however, was reflected in the quality of the blooms toward the end of the plant's life-cycle.

In a limited discussion, one cannot consider all the factors involved in a chemical balance in plants. For optimum growth, phosphorus sulphur, calcium, magnesium, iron and potassium are essential in the plant's metabolism. The trace elements such as boron, silicon, copper, chlorine, zinc and manganese are also of vital importance. In their absence the signs of deficiencies are quick to appear. A soil that is chemically balanced for the average crop of plants, may show deficiency for special varieties. Stocks (*Mathiola incana*) are very sensitive to potash deficiency. Their lower leaves turn yellow and die, and later the upper leaves show the same pathology, starting at the tips and progressing toward the petioles. Accessory potash feeding, in addition to balanced fertilizers, are usually necessary to keep this type of plant healthy.

For the gardener it is helpful to remember a few of the basic associations between the elements and the plant functions; such as the dominant association of nitrogen with top growth; phosphorus with root growth; potassium with carbohydrate (sugar, starch) production. Plants growing in soils with high available phosphorus show vigorous root growth; whereas plants in a high nitrogen medium, develop roots definitely smaller than similar plants grown with balanced fertilizers. In drought, this abnormal root to shoot relation would present considerable hazard.

The early recognition of the signs of deficiency is extremely important. Prime production is impossible without perfect balance. Deficiencies due to trace elements, although very serious, require but a trivial absorption of their salts to correct the defect. When soil conditions make them unavailable, the soluble salts of iron, manganese or other trace elements, in dilute aqueous solution sprayed on the foliage, will cure the malady. Although absorption by foliage is only slight, it is often adequate for trace element compounds.

In animal or plant life, serious diseases may be caused by the trifling absence of trace elements. In fertile Florida, cattle were starving in green pastures due to such trace element deficiencies as copper, iron and cobalt. Citrus-malnutrition was solved by use of compounds of copper, zinc, manganese, magnesium and iron. The proper use of these compounds has brought progress and economic strength to large communities. Other quantitatively lesser substances as vitamins, enzymes, hormones and antibiotics are progressively assuming greater biochemical significance.

With the approach of autumn the soil nitrogen shows a decrease, and its ratio to carbohydrate is such that the plant stores food. This procedure is beneficial in the hardening process of perennials and also supplies energy for the spring growth. The application of a high nitrogenous fertilizer at this time would disturb a normal balance by stimulating vegetative growth which will easily be killed by frost, and by consuming the stored food that was reserved for spring growth.

A healthy plant would indicate proper nutrient ratio. A phosphorus deficiency would produce a poor root growth and, even if there were an

abundance of nitrogen in the soil, the plant would still suffer from nitrogen deficiency because of its restricted absorptive mechanism. Ample nitrogen and phosphorus may produce vigorous vegetative and root growth but, if potash is deficient, the carbohydrate mechanism cannot properly function and the plant will soon be in distress. The biological functions are so interwoven and interdependent that any one deficiency may initiate a chain reaction of pathological events.

Even in the balanced presence of all material substances essential for plant life, adverse environmental factors such as cold or diminished light would be detrimental. Regardless how abundant the raw products may be, the plant cannot manufacture sufficient food with inadequate light. Water may be plentiful, but if the ground is cold, the absorption is slow. These are some of the reasons why, in northern greenhouses, winter-grown plants are decidedly smaller than the same species grown in the warm, sunny spring. Cold-grown snapdragons often wilt with the sudden appearance of bright sun. The air which is quickly warmed, promotes a transpiration more rapid than the absorption by the roots in the cold soil.

There are many factors involved in optimum growth. Unchecked rapid plant development provides maximum production in a minimum of time. Such procedures have been emphasized by DR. POST at Cornell. Large Geranium cuttings with all their leaves intact may be rooted and later potted with the production of large plants in a period of five to six weeks. The older methods required as many months. These procedures are not only botanically interesting, but also are economically important to commercial growers. With Chrysanthemums, short soft tip cuttings from vigorous stock plants are preferable. If sterilized sand is the rooting medium, several half-strength applications of a balanced liquid fertilizer should be applied. On soft green stems there will be no bud suppression when the plants are pinched. Cuttings should be taken from the sand or other rooting media when the roots are short (about ¼ inch). Planting at this time may be done with a minimum of root damage. Long-rooted cuttings with woody growth start the plants with a handicap from which there can be no complete recovery.

A rapid balanced growth indicates plant vigour; it is associated with optimum climatic and edaphic factors; it takes advantage of the natural growth cycles. A Fuchsia plant in the late fall may have fine foliage and blooms, but at this time is dormant as far as new vegetative growth is concerned. Cuttings at this stage will not root, but will do so as soon as the plant shows signs of new growth.

Under cultivation, in greenhouses and with house plants, there is a tendency for the soluble salts to approach toxic levels of concentration. Too liberal fertilizer applications and the use of the same soil for long periods aggravate this condition. As most of our common plants are mesophytes, they are intolerant of conditions approaching a xerophytic medium. As the osmotic tension of the soil-water increases, the plant's suction power becomes inadequate and wilting occurs, particularly so on sunny days. Under such conditions the plant's life is a precarious one; normal metabolism is impossible. Slight adjustments within physiological ranges probably take place, but for optimum growth this

condition must be corrected. The remedy, both for pot plants or bench grown crops, is copious leaching.

In nature, the mineral salts brought to the surface by evaporation are washed back in the soil by rain which is practically distilled water. Tap-water contains salts in solution, but the loss by percolation will be many times that which was added by leaching, and the soil can be restored to its proper tension level.

Soluble salts in soil solution ionize and are good conductors of electricity. By use of the Solu-Bridge conductivity apparatus, the percentage of soluble salts in a soil extract can be accurately determined. The specific conductance or K value is read in terms of microhms $\times 10^{-16}$ at 25° C. A specific conductance (K) of 100 approaches toxic levels of concentration and this corresponds approximately to 0·5 per cent. of salts in solution. Tap-water in our greenhouses has an average K value of 25. K values of 75 and less are desirable for most crops. This phase of chemical imbalance, when recognized, can easily be corrected, and soils that are toxic because of this condition can be normally restored.

In our greenhouse experience, the most vigorous growth takes place when the soil-water is in its most available form, and this occurs when its tension is at zero or slightly above, as indicated by tensiometer readings. At these tensions wilting will not occur. Plants subjected to frequent wilting will not produce blooms of prime quality. At the wilting stage the stomata of the leaves are closed and the carbon dioxide intake essential in photosynthesis is practically cut off. Although the sun may shine on a plant in such condition, it cannot manufacture food. The plant's condition may be poor in a soil that is rich with products that are unavailable.

I have elsewhere (2) discussed the significance of soil reactions. The *p*H or soil reaction plays a predominant role. Most plants thrive in the *p*H range extending from about 5·6 to 6·5. The *p*H of 7 indicates a neutral reaction and readings above 7 show alkalinity. It is in the slightly acid range that the maximum solubility of salts takes place and thus become available. At higher and lower *p*H ranges, nutrient salts may become locked into insoluble compounds, or soluble toxic salts may be produced. Hydrangeas, Azaleas and Rhododendrons have need for considerable iron, and as iron salts are only soluble in an acid medium, a *p*H of about 4·5 is best suited for their needs. These acid-requiring plants are sensitive to iron deficiency and quickly show a chlorosis when this element is lacking. At low *p*H values toxic soluble aluminium salts may be present. The aluminium salts are only toxic to plants growing in the medium *p*H range. Plants in the lower acid scale have adapted themselves to this toxic salt and may possibly use it in their economy.

Soil reactions and temperatures may vary or intensify colours. Chrysanthemums blooming in the late summer are not as intense in colour as the same variety blooming in the late autumn. The high night summer temperatures accelerate the plants' respiration with considerable consumption of the sugars. The cooler nights of the autumn allow the storage of sugar which enters into the synthesis of the anthocyanin pigments which chemically are glucosides. High night temperature is an extravagance that most plants cannot afford and they soon become

physiologically impoverished when grown in such a manner. In natural growth, the low temperatures are at night when the least amount of food is consumed in respiration, at a time when it cannot be manufactured.

The water-soluble plant pigments vary their colour with the plant sap reactions. Anthocyanins in acid medium become red; in an alkaline medium they are blue. Growing plants in the *p*H best suited for them will improve their colour. Hydrangeas require the presence of aluminium for blue coloration and the salts of this metal become available in the acid range. At a *p*H of 5·5 a clear blue will develop. With a scarcity or absence of soluble aluminium salts, the flowers are pink. White hydrangea blooms are indifferent to soil reactions, because the white in the petals, as it is in grey hair, is due to a colloidal dispersion of air bubbles in the tissues with its characteristic white light reflection. The response of foliage plants is more colourful when grown at the *p*H best suited for them. It is not my purpose to discuss here in detail the colours of vegetation but merely to point out that the contributing factors may be chemical and physical.

Spraying, dusting and the use of aerosols are not within the scope of this article. Their regular use is extremely important to the health of plants.

For the utmost in form and colour, time-pinching and disbudding are essential in the growth of pompon Chrysanthemums. Uncontrolled culture frequently results in a profusion of growth with few small blooms on many elongated slender branches. This is poor material for floral arrangements. Our objective in time-pinching is to allow only three main branches to grow, each to produce a full and symmetrical spray of choice blooms. The time of pinching is very important and will vary with the variety of the Chrysanthemum. Unless the date for the variety is correct, the harmony and beauty of the spray will be lost. If the pinching is done too early, the laterals on the main branches will grow too long before setting bud. This short-day plant cannot initiate bud formation until the proper photoperiod or day length has been reached.

A well-grown greenhouse Chrysanthemum plant should be eight or more inches tall when ready for pinching. Allow only three main stalks to develop and keep these well-trimmed. When the distal bud on each stalk is definitely set, it should be removed. If allowed to remain, this bud produces a large bloom that is well past its peak at cutting time or is concealed by the lateral blooms later on. Disbud so that each of the three sprays will have about six blooms. When the plants are about 18 inches high, the leaves on the lower thirds should be removed. This provides better ventilation, more light, and facilitates watering and cultivating. These procedures place the plants in the high nitrogen to carbon ratio essential for select foliage and bloom production. So striking is the improvement over uncontrolled growth, that, at times, it is difficult to believe we are dealing with the same variety. Chrysanthemums are short-day plants; they can be forced into bloom earlier by shading with dark cloth during the long days, or their blooming period may be delayed by increasing the day length during short days, with electric lights. The combined use of these systems make it possible to grow Chrysanthemums the year round.

Plant behaviour under cultivation represents its responses to our treatments. These reactions are very flexible, but reach their maximum of quality in the absence of limiting factors.

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VIOLAS

J. Wilson

HISTORY shows that from time to time once-popular flowers have a habit of falling into disfavour, or being forgotten for the time being. Fuchsias are a case in point, but quite recently interest in this flower was revived.

The Viola is another plant, once very popular, which now one rarely encounters massed in the way it should be to be effective.

There are few flowers which are capable of lasting over so long a period as the Viola, especially those flowering during late Spring and through the Summer months. This easily managed plant is attractive when grown by itself or used in combination with other subjects, planted in separate colours, or mixed.

It is happiest with partial shade, especially during the hottest part of the day, and to keep up a continuity of bloom it should be given generous soil treatment and never be allowed to suffer from the effects of drought. There is one other condition which it demands, namely the removal of all dead flowers at not more than weekly intervals.

It can be grown as a ground cover for many of the commoner Lilies, and the mauve varieties are effective growing in conjunction with Roses.

Where similar conditions exist Violas can be used effectively as shown in the photograph (Fig. 203), the borders in question being approximately 100 yards in length giving the appearance of a living patchwork quilt.

With the aid of a cold frame it is possible to grow this flower successfully, and to obtain the best results it should be treated as an annual.

Cultural requirements are simple:—

When the plants show signs of exhaustion during August, flowering shoots should be cut back to within about 3 inches of the crown, which will have the effect of encouraging the plants to produce a number of young shoots from the centre which prove ideal cuttings, these should be taken from time to time as they reach the correct stage during the months of September and October.

Prepare the cuttings in the orthodox manner and insert in a cold frame containing a sandy compost, placing these about 3 inches apart in each direction. Keep the frame closed and provide shade when necessary until the cuttings are rooted, after which they should be

Photos: Aero Pictorial Ltd.

Figs. 194, 195—The R.H.S. Gardens, Wisley, from the air

Photo, G. Darby

Photo, J.E. Downward

HYBRID LILIES

Fig. 196—(top) *Lilium parvum* × *L. Parryi* raised by the late DR. F. STOKER

Fig. 197—(bottom) *Lilium* 'Bridesmaid' **A.M.** July 12, 1950 (*L. nevadense* × *L. Parryi*) raised at Maidwell Hall (See p. 384)

Photo: G. Darby

HYBRID LILIES RAISED AT MAIDWELL HALL

Fig. 198—*Lilium* 'Shuksan' × *L.* 'Burbankii.' Some of these are 7 ft. high and carry more than 30 flowers to a stem. They have been grown in less than three years from scales.

Photo: J. E. Dimmock

NEW HYBRID LILIES

Fig. 1092—*Lilium* 'Dunkirk' **A.M.** June 27, 1950, growing at Wisley. Raised by MR. F. L. SKINNER, of Manitoba, Canada (See p. 436)

LILIES AT WISLEY

Fig. 200—*Lilium giganteum* in the woodland garden

SHOW AURICULAS

Fig. 201—Seedling white-edged Show Auricula flowering for the first time

(See p. 388)

SHOW AURICULAS

Fig. 202—Alpine Auriculas (right) 'Lady Daresbury,' a flowering offset (left) A seedling, first flowers on young plant (See p. 388)

Photo, Malby

Fig. 203—Borders of Violas at Trent Park (See p. 396)

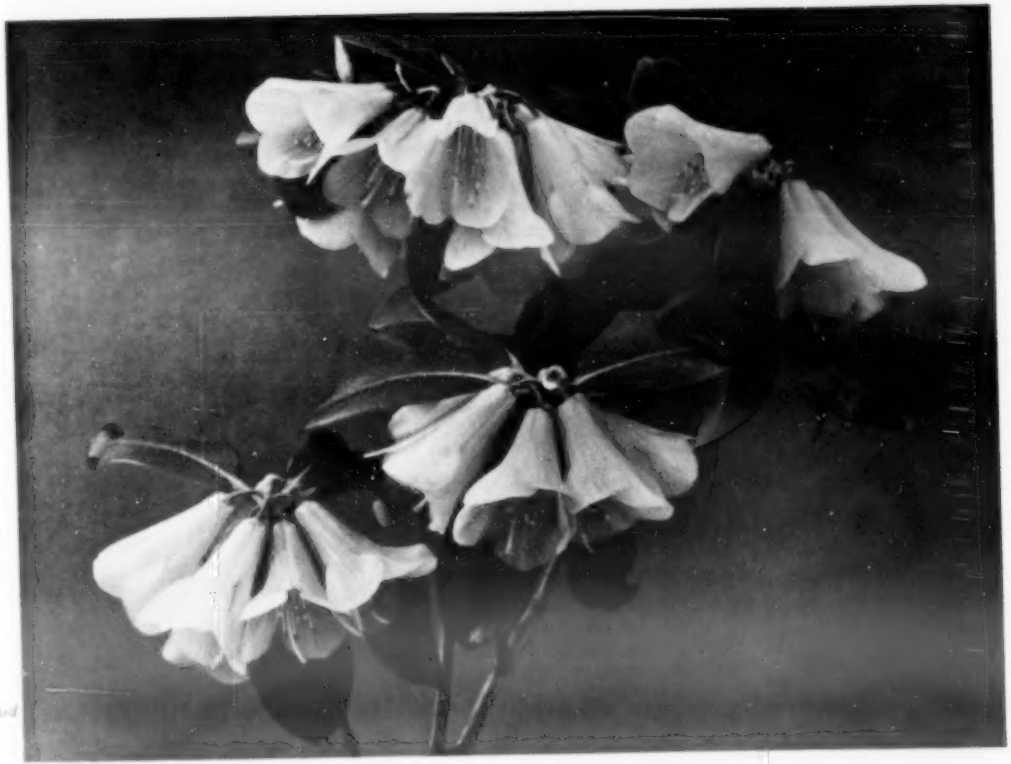
Fig. 204.—*Nepeta Faassenii* Bergmans (from a drawing by A. J. WISE). (See p. 404)

Fig. 205.—*Nepeta Mussini* Sprengel (from REICHENBACH, *Iconographia Botanica* t. 1. 587; 1828). (See p. 403)

Fig. 206—*Yucca radiosa*. A fine Yucca from La Mortola. (See p. 398)

RHODODENDRON AWARDS, 1950

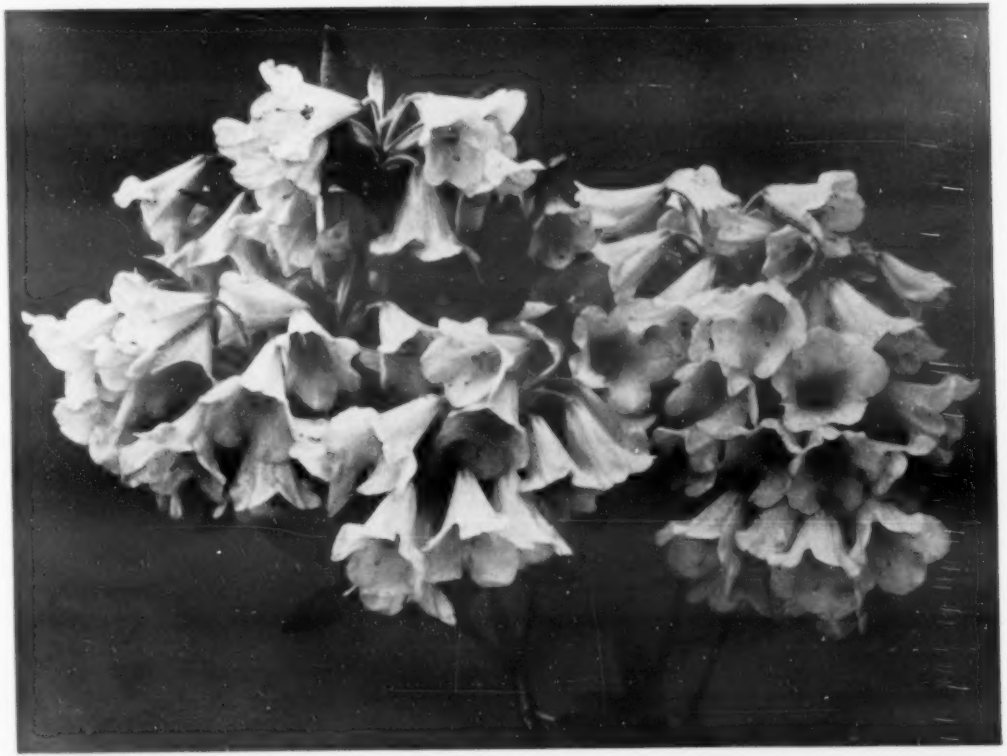
Fig. 207—Rhododendron 'Conroy' **A.M.** May 23, 1950 (*R. cinnabarinum* var. *Roylei* × *R. concatenans*) Exhibited by LORD ABERCONWAY and the National Trust (See p. 410)



Photo, J. E. Downward

RHODODENDRON AWARDS, 1950

Fig. 208 — Rhododendron 'Winsome' **A.M.** May 23, 1950 (*R.* 'Humming Bird' × *R. Griersonianum*). Exhibited by LORD ABERCONWAY and the National Trust (See p. 412)



Photo, J. E. Downward

Fig. 209.—*Rosa spinosissima* 'Frühlingsgold' **A.M.** May 23, 1950 (See p. 413)
Exhibited by MESSRS. T. HILLING & CO., Chobham

ROSE AWARDS

Fig. 210—*Rosa anemonoides* 'Ramona' **A.M.** May 23, 1950 (See p. 412)
Exhibited by MESSRS. T. HILLING & CO., Chobham

Photo, Ahling

given an abundance of air at all times whenever weather conditions permit.

No further treatment is necessary beyond ventilating the frame during the Winter. During spells of extreme frost it will be necessary to afford some form of protection.

Very little water will be required during the Winter months, and when this proves necessary suitable weather conditions should be chosen for this operation (absence of frost, but with light sunny conditions prevailing).

During March (normal weather conditions prevailing) harden the plants with the object of transferring these to their flowering quarters towards the end of the month, placing them about 9 inches apart.

Subsequent treatment consists in removing all flowers for about a month until the plants become well established; should the season prove abnormally dry, give copious waterings.

With the weekly removal of all dead flowers, water when required, an occasional dressing of dried blood and the control of pests and diseases the plants will repay with an abundance of bloom over a very long period.

Habit varies somewhat, some varieties incline to become straggly with age, whereas others retain a compact habit. The size of the flower ranges from very large in the case of 'Moseley Perfection' down to comparatively small ones in the variety 'Jackanapes.'

Fortunately the colour range in Violas is wide, ranging from white to deepest purple.

'Swan' and 'Peacefold' are amongst the best whites, while 'Bridal Morn,' 'Newton Mauve,' and 'Maggie Mott' represent the various shades of mauve. 'Pickering Blue' is possibly the best of this colour with 'Admiration' a good deep purple.

'Primrose Dame' is lemon whereas 'Moseley Perfection' is a deep rich yellow. 'Kathleen,' white ground edged rose, is another very distinctive variety.

Aphids are the most serious pest of the Viola, and may be kept in check with a timely and routine application of a contact wash, e.g. Nicotine-soap or Nicotine Substitute (HETP or 'Mortopal').

Care should be taken to wet the underside of the leaves as far as possible to ensure that the insects are wetted by the insecticide.

Unfortunately Violas are subject to a Pythium which accounts for the plants dying at ground level. Watering the ground with Cheshunt Compound is advised in this instance.

NOTES FROM FELLOWS

A Simple method for Propagating Camellias

WITH ordinary care the propagation of most "japonica" Camellias from leaf cuttings presents no difficulties. But if it is desired to expedite their rooting and to reduce labour to an absolute minimum the writer can recommend the method described below. From your local shop, if you can persuade the owner to sell it to you, buy a large-mouthed glass sweet jar (it is essential that the opening be big enough to admit

one's hand). Having acquired this vessel first place a layer of charcoal at the bottom and then more than half fill it with a mixture composed of equal parts of finely chopped green sphagnum moss and coarse silver sand. On the top of this scatter a few more pieces of charcoal, the idea being that this will absorb any excess of carbonic acid gas that may be liberated by the cuttings. The whole contents should then be thoroughly moistened but not water-logged. The Camellia leaf-cuttings can now be inserted in the ordinary way. When this has been done the stopper is replaced which will cause the jar to be hermetically sealed. The only fresh air subsequently admitted will be that which enters accidentally when the cultivator's curiosity prompts him to see how the cuttings are progressing. The writer shades externally (on one side only) the upper unfilled portion of the glass jar but allows sunlight to fall unimpeded on the lower part containing the rooting medium: the jar is then placed on a sunny bench in an unheated greenhouse and thereafter is given no attention.

Some of the leaf-cuttings of the hybrid Camellia 'Donation' taken in June and treated in this manner had rooted and were ready for potting by the fifth week: the others had all calloused and were just forming roots.

Benenden, Kent. COLLINGWOOD INGRAM

Some Notes from the Hanbury Gardens, La Mortola, Ventimiglia, Italy

Yucca radiosa, a tree about 60 years old, has never before had more than two flowering heads. Its habit of clustering its bell-like flowers, forming great roses unlike most members of the family, make it singularly beautiful. (Fig. 206.)

Romneya Coulteri var. *tricocalyx* has done magnificently this year owing to heavy manuring. It is over 8 feet in height.

Erythrina Crista-galli is in full flower and is a most attractive tree-shrub, very useful for picking, though not so decorative as *E. insignis*, of which our big tree, over 50 feet high, was destroyed by shelling.

There is not much in flower now, except masses of Bougainvillaea, copper, flame, deep purple and the common one. Next year I hope to flower three new varieties brought me from Jamaica by my brother, Captain Symons-Jeune.

Geraniums of all colours are in full bloom, but too common, however lovely, to mention in your pages! The lovely *Cassia coquimbensis* is out in golden clusters, as well as blue Jackerandas and the tall tree *Grevillea robusta*, and *Albizzia Julibrissin*. DOROTHY HANBURY

Growing Gentiana verna in very dry districts

Instructions for growing plants that are not entirely easy are of little use unless the exact locality is known, as conditions throughout the country vary enormously.

My garden is on the top of a very dry, well-drained, limestone hill and the annual rainfall is about 21 to 22 inches. After some unsuccessful attempts at retaining sufficient moisture for such plants as *Gentiana*

verna, I took a large zinc bath about 2 feet deep, sealed up the plug hole entirely and sunk it in the rock garden. The bath was filled with a very rich mixture of rotted compost, manure, peat, loam and sharp sand and the top few inches at one end with a mixture of about equal parts of sharp sand and peaty soil. This was well soaked and some plants of *Gentiana verna*, previously raised from seed were put into it.

These have flourished here without any trouble and without watering for three years. Other plants in this bath, which are flourishing, include *Nomocharis pardanthina*, *Iris Kaempferi*, some bog Primulas and *Iris lacustris*.

J. CLUTTON-BROCK, M.A., M.B.

Lincoln.

PUYA ALPESTRIS IN ITS NATIVE LAND

W. Balfour Gourlay

CHILE, as we all know, is a country that has given us many magnificent flowering trees and shrubs, as well as plants for the herbaceous border and cool greenhouse: e.g. *Eucryphia*, *Crinodendron* and *Embothrium* among the first group; *Salpiglossis*, *Alstroemeria*, *Calceolaria*, *Alonzoa* and *Schizanthus* among the second and third. Being a succulent xerophyte, *Puya alpestris* may be classified as a large rock plant.

For recent descriptions of the plant in cultivation, with beautiful illustrations, one should turn to Chapter VII of P. M. SYNGE'S *Plants with Personality* and to LIEUT.-COL. C. H. GREY'S Fellow's Note in the September 1949 number of this JOURNAL, under the heading *Puya Whytei* (*P. alpestris*, however, being the older name, is preferred to that of *P. Whytei*• in accordance with the Vienna Rule).

Before considering *Puya alpestris* in its native land, we must understand something of the remarkable climatic conditions that prevail in that country. Chile, though only from 100 to 250 miles broad from West to East, is as much as 2,700 miles long from South to North. Up along this coast, from Antarctic regions, sweeps the cold Humboldt current right up to or beyond the Equator, with the result that N. Chile and much of Peru are rainless, the sea being colder than the land, thus preventing precipitation as rain. About Tierra del Fuego (Lat. 52–55° S.) the wind blows continuously from the West and the rainfall is anything up to 300 inches *per annum* on the West side of the mountains, and decreases continuously from South to North in association with a gradual counter-clockwise change in the direction of the prevailing winds. Thus at Ancud (Island of Chiloé, Lat. 42° S.) the rainfall is about 200 inches, but only about 10–20 at Valparaiso (Lat. 33° S.) where the prevailing wind is from the South. North of this the wind tends to blow from the land. However, about Coquimbo (Lat. 30° S.), with only 2 or 3 inches of rain *per annum*, the coastal hills are surprisingly green, in early summer at any rate. This is due to fog banks which occur when the warm air from the land comes in contact with the cold sea-water, which fog-laden air is sucked back over the coastal hills with the sharp fall of

• *Puya alpestris* (Poepp. et Endl.) Gay (1853) which is based on *Pourretia alpestris* Poepp. et End. (1833). *P. Whytei* Hook fil. (1868).

temperature that usually occurs on land about sunset. The condensation of this moisture accounts for the unexpected verdure. Nor are the local plants all xerophytes. For example, the delicate little *Calceolaria picta* (*Bot. Mag.* T. 9312) grows in shady places under the drip from leaves of *Fuchsia* and other bushes.

Chile has been described as the Western slope of the Andes in their Southern portion; but this is an over-simplification, as the main Cordillera is separated from the lower Coast Range by the fertile Central Valley. But, owing to a process of submergence in some past epoch, the Coast Range in S. Chile has been broken up into a string of islands and the Central Valley had become a series of channels, much used to-day by small craft in an endeavour to escape from the rigours of the "Roaring Forties." From Cape Horn to Valdivia, in the fifties and forties, the hills are clad in dense forests of *Nothofagus spp.* (Southern Beech) with a few conifers. The Chilean Lake District lies at the lower end of the Central Valley, between Puerto Montt and Valdivia. Here the scenery is magnificent. These temperate Chilean rain-forests have a tropical appearance, with many bamboos (*Chusquea spp.*) and the trees festooned with epiphytes and hanging lianes. Valparaiso (Lat. 33° S., Mean Temp. 60° F.) has a long dry summer with some 10–20 inches of rain in winter. The hills are covered with open scrub country with small trees and bushes and tall Cacti on sunny Southern slopes of the valleys. Vegetation gets scarcer North of Coquimbo (30° S.) until the rainless nitrate deserts of N. Chile are reached.

The family *Bromeliaceae* is represented in Chile by several genera, of which *Puya* is the most striking. Of these we* found *P. violacea* at Los Baños de Cauquenes only, *P. alpestris* there and also at Coquimbo, and *P. chilensis* in various places. A few rare and local species, including *P. coerulea*, we did not see. *P. chilensis* and *P. alpestris* (*vel P. Whytei*) are nearly related; and though both occupy a wide range from North to South in Central Chile, *P. chilensis* is the commoner of the two. The flowers of *P. chilensis* are of a slightly greenish-yellow, while those of *P. alpestris* are of a quite sensational malachite blue-green. The leaves of the latter species are more glaucous and decumbent than those of *P. chilensis*. The branches of these great rock plants are often from six to ten feet high, the stems and branches ending in tufts of leathery leaves, edged with narrow spines. One or more great compound flower spikes rise vertically from the ends of stems and branches, as high again as the rest of the plants. The flowers of both species contain sweet nectar in great abundance, presumably to supply the needs of humming-birds rather than insects. The flowers of both species are crowded together on the first few inches of the spikelets, a foot or more of their distal ends being clad only with sterile bracts suggesting their use as bird perches. Though humming-birds usually hover while sucking nectar, some species will take advantage of twigs, if conveniently placed for their purpose. (H. O. WAGNER† shows a picture of Heloise's Humming-bird perching on a

* Mr. Clarence Elliott and I.

† H. O. Wagner, "Food and Feeding Habits of Mexican Humming-birds." *Wilson's Bulletin*, Vol. 58, No. 2, fig. 1.

twig of *Erythrina americana* while sucking nectar from flowers.) Though humming-birds show a preference for red tubular flowers, which (like the little birds themselves) are abundant in all American countries, they also visit flowers of other colours where these are large and conspicuous as in *Datura*, or occur in large and conspicuous inflorescences as in *Puya* and *Agave*.

The remains of leaves of previous years persist as a black scaly covering to old stems and branches, giving them a burned appearance. This has given rise to the strange but widely held notion that the plants are subject to spontaneous combustion! The stems of old plants, especially where growing on steep rocks, are much contorted and resemble writhing snakes.

MR. CLARENCE ELLIOTT and I spent portions of the years 1927 to 1930 collecting plants in Chile. Unfortunately, when we first encountered *Puya alpestris* we were wrongly informed that it was *P. coerulea*, a name which fitted it well, but rightly belongs to a rare or local species which we never saw.

Travelling gradually southwards, we came to Concepcion (Lat. 36° 50′ S.)and there we suddenly walked into a group of blue-green flowered *Puyas* in full flower, growing in a climate with abundant rainfall, yet in every way similar, except in size, to the plants we had seen in the much dryer northern regions. For this little group of plants, all growing within 100 yards of each other, were no more than 4 or 5 feet high, including the flower spikes! We concluded that they must belong to a dwarf variety of their more Northern relatives, or to a nearly related species. ELLIOT promptly gave them the provisional name of *P. coerulea pygmia*.

It was not till rooted layers had been brought home, and a flowering spike shown at Chelsea in 1936, where it received a well deserved Award of Merit, that we first heard the name *Puya alpestris*. So it was a disappointment to discover later that *Puya alpestris* was not, as we supposed, a new introduction to this country. It was in 1864 that MESSRS. VEITCH introduced it from Chile through the agency of a MR. MARK WHYTE, after whom it was called *Puya Whytei* in 1868, evidently in ignorance of the fact that a full description of the plant, under the name *Puya alpestris*, is given in Vol. VI of the botanical portion of CLAUDIO GAY'S *Historia fisica y politica de Chile*, published in Paris in 1853. The plant was figured in *Bot. Mag.* T. 5732 in 1868; but the artist failed entirely to capture the strangely fascinating but elusive blue-green of the flowers. MR. J. TYERMAN grew it at Tregony in Cornwall and flowered it in 1881 in a sunny dry spot (*Gard. Chron.* Oct. 1, 1881).

A striking point about many Chilean plants is the length of their area of distribution from North to South, so that their various members experience a remarkable range of climatic conditions. To obtain hardy types it is necessary to obtain specimens or seed from as far South as possible. *Embothrium coccineum* is a case in point. The distribution of *Puya alpestris* is given as from La Serena (Lat. 30° S.) to the Bio-Bio River (Lat. 37.45° S.). Thus our recent introduction was collected near the extreme South end of the range of the species. So, though we cannot be certain that the plants were not immature and therefore small, we

can be certain of their maximum hardiness, as proved by the flowering of LT.-COL. GREY'S plant in the open at Malton in East Yorkshire. But few Chilean plants will stand one of our colder winters without some protection.

During my first short visit to Chile in 1908, my friend DR. EDWIN P. REED, of Valparaiso, a physician and amateur entomologist, showed me the immense caterpillars (over four inches long) of a moth which lays its eggs on the stems of *Puya chilensis* and *P. alpestris*. The former species is most frequently attacked, probably because it is the commoner one of the two. On hatching, the caterpillars tunnel the stems. Later the pupæ make long cocoons on the outside of the stems, in which they can be heard running up and down when disturbed. The cocoons may be as much as ten inches long. None of the moths were hatched out at the time of my visit. A paper by DR. REED about this remarkable insect (*Castnia eudesmia* Gray)* has come into my hands. The moth is brightly coloured and flies by day, and is said to drive away other insects and even humming-birds from the *Puya* plants. DR. REED mentions that he has seen the great moths dusted with *Puya* pollen; so they, like the humming-birds, may take a hand (or some part of their anatomy) in pollinating the flowers. The female insects are considerably larger than the males.

N.B.—DR. REED'S father (DR. EDWIN C. REED) was one of the few people who found, growing wild in Chile—in the sixties of last century—that rare and beautiful plant *Tecophilaea cyanocrocus* (see *Bot. Mag.* T. 8987).

Seven species of *Castnia* have been recorded from Brazil; and among the plants whose stems are attacked by their caterpillars are bananas, sugar cane and various Bromeliads and Orchids.

In the North Gallery at Kew, among MARIANNE NORTH'S flower pictures from all over the world, No. 25 ("Blue Puya and Moths") was painted at Apoquindo, near Santiago, in the autumn of 1884. It shows a large plant of *Puya alpestris* (*vel P. Whytei*) with some of these brightly coloured moths (*Castnia eudesmia*), and one of the cocoons attached to a stem. It is to be hoped that the North Gallery will again be opened to the public without undue delay.

CLARENCE ELLIOTT found by experience at Stevenage that, in the absence of humming-birds, artificial cross-pollination is necessary to obtain *Puya* seed; and the exchange must be between flowers from different plants, as *Puya alpestris* is self-sterile. This is not always easy, even for owners of two or more plants, as the latter may not flower at the same time.

If anyone possessing plants of *Puya alpestris* about to flower cares to write to me at 7 Millington Road, Cambridge, giving me his or her name and address, I will do my best to put them in touch with others in the same position. Mature flowers, emptied of their nectar and sent by post in a carefully padded tin, should arrive, with any luck, with still viable pollen. It would be a misfortune were this splendid plant to die out of cultivation again, especially in its most Southern and hardy form.

* '*La Castnia eudesmia*, Gray,' by Dr. Edwin P. Reed. *Revista Chilena de Historia Natural*, Año xxxviii (1934), pp. 267–271.

NEPETA MUSSINII AND N. × FAASSENII

William T. Stearn

ABOUT 1802 a Russian count, APOLLOS APOLLOSOVICH MUSSIN-PUSHKIN, made an expedition to the Caucasus. Little is known about him or his travels, which may have been in search of minerals, for he was a chemist and physicist, but he certainly collected specimens of Caucasian plants, and among them were several new species. Accordingly, in 1805, the year of his death, a compatriot, J. M. F. ADAMS, named a new genus of liliaceous bulbous plants Puschkinia in his honour, this being typified by the now well-known *P. scilloides*. Another plant which commemorates MUSSIN-PUSHKIN is a Catmint, *Nepeta Mussinii*. This was dedicated to him by a German professor, KURT SPRENGEL (1766–1833), but the original description, based on a Caucasian plant grown in the Halle botanic garden, was published by SPRENGEL's pupil, COUNT LEO VICTOR FELIX HENCKEL VON DONNERSMARK (1785–1861), in a slim quarto work entitled *Adumbrationes Plantarum nonnullarum Horti Halensis Academici* (24 pages; Halae, 1806). Study of his detailed description removes all doubt as to the identity of the original *N. Mussinii*. It was introduced into English gardens about 1802 or 1803 and figured in the *Botanical Magazine*, **23**, t. 923 (April 1806), as *N. longiflora* (non Ventenat). Another figure of *N. Mussinii* (Fig. 205) was published by REICHENBACH in his *Iconographia Critica*, **6**, no. 806, t. 587 (1828). Both illustrations portray a low-growing plant with heart-shaped leaves and a short inflorescence, very different in general appearance from the plant commonly grown in British gardens to-day as *N. Mussinii*. They agree, moreover, with HENCKEL's description of his *N. Mussinii*, and a plant of the same character is still to be found in British gardens. There are, in short, two plants now cultivated as *N. Mussinii* and the one generally known under this name in British gardens is not *N. Mussinii* at all. They may be readily distinguished by their leaves. In the true *N. Mussinii*, a native of the Caucasus and Persia, the leaves are ovate to broadly ovate (length to breadth often about 3 to 2) with a cordate base, up to 2·1 cm. broad. In the false *N. Mussinii* (i.e. *N. Faassenii*) the leaves are lanceolate to narrowly ovate (length to breadth often almost 3 to 1) with an almost truncate base. This misapplication of the name *N. Mussinii* became evident fifteen years ago* and the writer accordingly tried to ascertain the identity of the popular garden plant, commonly though wrongly known in England as *N. Mussinii*, by means of a cursory survey of botanical literature relating to Nepeta, and of specimens in the Kew, Berlin and Weimar herbaria. The only herbarium specimens which exactly matched it were from cultivated plants; there seemed no wild species with which it could satisfactorily be identified and no published name whereby it could be designated as distinct from the true *N. Mussinii*. Hence the plant either belonged to a species rare in nature or was of garden origin. It appeared to be unnamed. The genus Nepeta includes, however, about 150 or more species, upon which botanists have bestowed more than 390 names, and like so many other genera it stands greatly in need of critical revision.

* In 1921 JOHN FRASER pointed out in the *Gardener's Chronicle*, **70**, 171 (Oct. 1921) that there were two forms in cultivation under the name *N. Mussinii*.

A detailed investigation ought to precede the publication of new names within the group. In these circumstances it seemed best to continue calling the garden plant "*N. Mussinii*" hort. non Sprengel, knowing full well that sooner or later it would have to receive another name. Since then two names have been given to it, JOHN BERGMANS naming it *N.* × ***Faassenii*** in a Dutch book on herbaceous plants in 1939 and ERNST VILHELM FLOTO naming it *N.* × ***pseudomussinii*** in a Danish horticultural journal in 1944. (Fig. 204.)

Nepeta Faassenii (syn. *N. pseudomussinii*) is always propagated vegetatively because it does not set seed. Examination of its pollen by FLOTO and his collaborator, GUDNI GUDJONSSON, revealed this to be completely sterile. Reduced fertility or complete sterility of the pollen often characterizes hybrid plants. Cytological study proved *N. Faassenii* to be triploid with $2n = 26$ chromosomes, whereas the related *N. Mussinii* having almost completely fertile pollen (about 96 per cent. fertile) is a diploid with $2n = 18$ chromosomes. These facts suggested that the triploid *N. Faassenii* might be a hybrid between the diploid *N. Mussinii* and a related tetraploid species, the most likely being *N. Nepetella*, which has $2n = 34$ chromosomes (probably derived from 36, the basic number in Nepeta being 9). This south European species is often cultivated in botanic gardens along with *N. Mussinii* and has lanceolate leaves. It grows up to 2 feet or so high and is of erect habit. In leaf-form and other characteristics the triploid *N. Faassenii* thus stands midway between the diploid *N. Mussinii* and tetraploid *N. Nepetella*, and there seems no reason to doubt that these are its parents. Further evidence is supplied by "the fact that one large chromosome, identical with that of *N. Nepetella*, is present in the root-tip plates." Of the 26 chromosomes of *N. Faassenii*, 17 are considered to be of *N. Nepetella* origin and 9 from *N. Mussinii*. For fuller particulars the detailed paper by FLOTO and GUDJONSSON in *Royal Veterinary and Agricultural College, Copenhagen, Yearbook* (*Kongel. vet. Landbohøjskole, København, Aarsskrift*) 1947, 31–39 (1947), should be consulted. In England L. F. LA COUR has confirmed the triploid nature of *N. Faassenii*.

It may be noted here that floral differences are associated with those in habit, leaf, fertility and chromosomes already mentioned. The flowers of *N. Faassenii* are slightly smaller and paler than those of *N. Mussinii* and have the anthers included instead of protruding.

The history of *N. Faassenii* is obscure. *N. Nepetella* was introduced into British gardens about 1760, *N. Mussinii* about 1803. Since then there must have been many opportunities for the two species to cross in Continental as well as in British botanic gardens. It is worth noting that BENTHAM, writing in 1834 about *N. grandiflora*, stated that "this plant is common in continental botanical gardens where it appears to have mixed with *N. Mussini* and produced a variety of hybrids, which have been published under various names, borrowed from most of the other species of this section; and, in general, less reliance is to be placed on the names of Nepeta in various herbaria and gardens than of almost any other genus of the order." (*Gen. Sp. Lab.* 481). FLOTO and GUDJONSSON state that in the Copenhagen Botanic Garden, where *N. Mussinii* and *N. Nepetella* are grown side by side, "several seedling

plants, resembling *N. pseudomussinii* to a very high degree and sterile as this plant, have been found. Their chromosome number is also 26." The Kew Herbarium possesses a specimen, grown sometime before 1876 under the name *N. caerulea* in the garden of EDWARD LEEDS, of Narcissus fame, which appears to represent this plant. That it had arisen by 1890 is shown by a detailed article on "*Nepeta Mussini*," by E. ANDRÉ in the French horticultural journal *Revue Horticole*, 1891, p. 300. This has a coloured plate depicting not the true *N. Mussinii* but the plant so commonly known under that name to-day, *i.e. N. Faassenii*; ANDRÉ remarked that it was rarely cultivated. Since then this Catmint has become a common edging plant in British gardens, esteemed both for its greyish-green foliage and its profuse spikes of lavender flowers. As a garden plant it is far superior to both its parents. In the genus Heuchera hybrids have superseded the parent species as plants for garden decoration. The hybrid *Anemone* × *hybrida* and its white sport 'Honorine Jobert' have become widely known under the name *A. japonica*, which belongs rightly to one of their parents, *A. hupehensis japonica*, now a scarce plant in cultivation. *Romneya* × *hybrida* (*R. Coulteri* × *R. trichocalyx*) is sometimes grown as *R. Coulteri*. This example given by *Nepeta* × *Faassenii* of a hybrid becoming widespread in gardens under the name of one of its parents is thus by no means a solitary one.

On a light well-drained soil and in a sunny position *N. Faassenii* is perfectly hardy in England and grows vigorously; it is an excellent plant for a dry-wall as well as for edging. On a heavy damp clay soil, however, it may perish during the winter. FLOTO and GUDJONSSON state that "in Denmark *N. pseudomussinii* is not hardy in all years, and in severe winters it will easily be damaged if not covered." Spring planting gives better results than autumn planting. It is debatable as to whether the old dead growths should be left untrimmed during the winter, indeed up to the middle of April, to protect the new shoots from frost. Cuttings of flowerless shoots about 3 inches long, taken in June or July and inserted in moist sand or sandy soil in a cold frame or under a bell-glass or a large glass jam-jar, root within a month and may be planted out in August or September. The statement in some books that *N. Mussinii* can be propagated by seed refers to the horticulturally less important true species and not to its showy profuse-flowering sterile descendant *N. Faassenii*. It was the latter which received in 1935 the R.H.S. Award of Garden Merit and which is described in R.H.S. JOURNAL, **67**, 169, fig. 59 (1942) as *N. Mussinii*.

Since no Latin diagnosis accompanies the original Dutch description of *N. Faassenii* by BERGMANS, *Vaste Planten* 2nd. ed. 544 (1939) and the English description by LAWRENCE in *Gentes Herb.* **8**, 64 (1949), the Danish description of *N. pseudomussinii* by FLOTO in *Gartner-Tidende*, **60**, 450 (1944), and the English description by FLOTO and GUDJONSSON in *Yearbook Roy. Veterin. Agric. Coll. Copenhagen*, 1947, 33, one is provided here to validate the name in accordance with *Int. Rules Bot. Nomencl.* 3rd ed., art. 38 (1935):—

Nepeta × *Faassenii* Bergmans, hybrida hortensis nova; a *N. Mussinii*, quacum in hortis confusa est, foliis angustioribus lanceolatis vel anguste oblongo-ovatis basi fere truncatis (nec ovatis vel late ovatis basi distincte cordatis), a *N. Nepetella* habitu procumbente humiliore, ab ambabus sterilitate pollinis inter alia distinguitur. Specim. authent. in *Herb. Hort. Kew*! *Herb. Mus. Brit.*! *Herb. Mus. Paris*! *Herb. Bailey Hort.*!

FLOTO's original Danish description may be translated as follows:—

"Plant perennial, short-tomentose throughout, grey-green, profusely branched from the base and forming a dense mound 1 metre across, 40 to 50 cm. high. Stems slightly four-angled, prostrate or ascending, more or less strongly branched. Internodes 2 to 4, seldom 6 cm. long. Leaf-blades oblong-ovate, evenly tapering to the tip, coarsely serrate. Veins impressed on the upper side of the blade, elevated on the lower side. Length of blade varies from barely 1 cm. up to 3 cm. Petiole up to 1 cm. long but often less than 5 mm. long. Calyx 5 to 6 mm. long, narrowing towards the tip. Calyx-lobes 1–1·5 mm. long. Corolla-tube very slender, slightly bent, only a little longer than the calyx. The short-stalked almost sessile flowers, which are gathered together on terminal branched shoots, have a length of 7–8 mm. Colour red-violet with darker spots on the inside. Lip violet. The whole plant has an aromatic mint-like smell and is probably completely sterile. From the investigations of MR. GUDNI GUDJONSSON, M.SC., it is evident that the plant does not form properly developed (i.e. fertile) pollen." (FLOTO, l.c., 1944.)

SUMMARY

Under the name *Nepeta Mussinii* two plants are widespread in gardens. One is the true *N. Mussinii*, a species native to the Caucasus, but this is neither so popular nor horticulturally so valuable as its hybrid descendant *N.* × *Faassenii*, a plant of garden origin unknown in a wild state. The distinguishing features of the two plants are stated above.

WISLEY TRIALS, 1950

RHODODENDRONS AT WISLEY, 1950

The following varieties of Rhododendrons were recommended for Awards after trial at Wisley, by the Rhododendron Trials Committee, who made their recommendations for awards on May 5 and May 31, 1950, as given below.

Rhododendron (Azalea) 'Addy Wery' (*malvatica* × 'Flame'). **A.M.** May 5, 1950.—Of compact, dwarf, very free flowering habit, evergreen, with one or two open funnel-shaped flowers in a truss. The corolla 1¾ inch diameter, the five petals Blood Red (H.C.C. 820/2) on Orient Red (H.C.C. 819/2) with a dull orange-bronze flush. Raised and introduced by The Old Farm Nurseries, Boskoop, Holland, and sent by Messrs. M. P. Cooper & Son, Muirfield, Ferndown, Dorset.

Rhododendron (Azalea) 'Apple Blossom' (*Azuma Kagami*). **A.M.** May 5, 1950.—Of compact, dwarf, very free flowering habit, evergreen, with two or three open funnel-shaped flowers in a truss. The corolla 1¾ inch diameter, the ten petals Neyron Rose (H.C.C. 623/2) with a small blotch of Phlox Pink (H.C.C. 625). Sent by the Knap Hill Nursery, Ltd., Woking, Surrey.

Rhododendron 'Dawn,' A.M. May 5, 1950.—Bush compact, very free flowering, carrying the trusses well above the foliage, with eight large open funnel-shaped flowers in a round, flat-topped truss. The corolla 4 inches diameter, 2¾ inches long, margins somewhat reflexed, of good texture; colour white flushed Phlox Pink (H.C.C. 625/3); buds flushed Phlox Pink (H.C.C. 625/2). Sent by Messrs. Waterer, Sons, & Crisp, Ltd., Bagshot, Surrey.

Rhododendron (Azalea) 'Exquisita.' A.M. May 31, 1950.—Plant vigorous, forming a well-shaped, compact, free-flowering bush with deciduous light glossy green foliage. Flower trusses flat domed, 12 to 20 flowered. Flowers 2 inches long, 2¼ inches diameter, long funnel-shaped, expanded,

creamy-white with a soft flush of Amber Yellow (H.C.C. 505/2), blotched Saffron Yellow (H.C.C. 7/1). Raised and sent by Messrs. W. C. Slocock, Ltd., Woking, Surrey.

Rhododendron (Azalea) 'Homebush.' A.M. May 31, 1950.—Plant vigorous, free flowering, forming an erect, graceful shaped bush, with deciduous, light green foliage. Flower trusses round, with 14 to 16 flowers. Flowers semi-double, open funnel-shaped, 1½ inch diameter, 1¼ inches long, Neyron Rose (H.C.C. 623) on a base of Rose Madder (H.C.C. 23/1). Raised by Knap Hill Nursery, Ltd., Woking, Surrey, and sent by Messrs. W. C. Slocock, Ltd., Woking, Surrey.

Rhododendron (Azalea) 'Knap Hill Pink.' A.M. May 31, 1950.—Plant vigorous, very free flowering, forming a well-shaped bush, with deciduous light glossy green foliage. Flower trusses dome-shaped, 6 inches across, with 14 to 18 flowers. Flowers open funnel-shaped, almost flat, 2¾ inches diameter, five petals, Phlox Pink (H.C.C. 625/1) flushed Neyron Rose (H.C.C. 623/1) margins darker, blotched Saffron Yellow (H.C.C. 7/1). Raised and sent by Knap Hill Nursery, Ltd., Woking, Surrey.

Rhododendron (Azalea) 'Marion Merriman.' A.M. May 31, 1950.—Plant vigorous, forming a free-flowering, low, well-shaped bush, with deciduous light glossy green foliage. Flowers trusses large, dome-shaped, 18 to 30 flowers per truss. Flowers flat, open, six petals, 3 inches diameter, Chrome Yellow (H.C.C. 605/1) flushed Indian Yellow (between H.C.C. 6/1 and 6/2) with a large Cadmium Orange (H.C.C. 8) blotch. Raised, sent and introduced by the Knap Hill Nursery, Ltd., Woking, Surrey.

Rhododendron 'Scandinavia' ('Hugh Koster' × 'Betty Wormald'). A.M. May 31, 1950.—Plant of bushy habit, free flowering. Flower trusses round to dome shaped, 14 to 18 flowered. Flowers 3½ inches diameter, open funnel-shaped, Cardinal Red (H.C.C. 822) on a Rose Red (H.C.C. 724) base, with a black blotch. Raised, introduced and sent by Messrs. M. Koster & Sons, Boskoop, Holland.

Rhododendron 'Lavender Girl' (Fortunei × 'Lady Grey Egerton'). A.M. May 31, 1950.—Plant of compact, free flowering habit. Flower trusses dome-shaped, 16 to 20 flowered. Flowers open funnel-shaped, 3¾ inches diameter, at margins of petals Amaranth Rose (H.C.C. 530/2) passing to a paler shade at centre which is white. Raised, introduced and sent by Messrs. W. C. Slocock, Ltd., Goldsworth Nursery, Woking, Surrey.

Rhododendron (Azalea) 'Mustard.' A.M. May 31, 1950.—Plant of vigorous, free flowering habit, forming a well-shaped bush, with light glossy green deciduous foliage. Flower trusses flat dome-shaped, 9 or 10 flowered. Flowers flat open, 3 inches diameter, Indian Yellow (H.C.C. between 6/1 and 6/2) with a large blotch of Indian Yellow (H.C.C. 6). Raised, introduced and sent by Messrs. W. C. Slocock, Ltd., Goldsworth Nursery, Woking, Surrey.

SWEET PEAS AT WISLEY, 1950

One hundred and fifty-three unnamed seedlings of Sweet Peas were received at Wisley for trial in the autumn of 1949. They were sown—36 seeds of each variety—on October 11, 1949, under glass in seed boxes. On November 22, 1949, the seedlings were potted singly into large 60's sized pots and placed in cold frames for the winter months, and were given free air except during frosty weather. On March 20, 1950, twenty-four plants of each were planted in double rows, twelve grown disbudded as cordons, twelve allowed to grow naturally on sticks. All made good growth and were finally judged by the Joint Committee of the Royal Horticultural Society and

the National Sweet Pea Society on June 12, 1950, who made their recommendations for awards as given below.

FLOWERS WHITE

Albatross (raised, introduced and sent by Messrs. W. J. Unwin, Ltd., Histon, Cambs.). **H.C.** June 12, 1950.—Plant vigorous, flower stems stiff, 14 inches long, four flowered, well and regularly spaced; flowers 2¼ inches diameter, of good substance, white, sweetly scented.

FLOWERS PALE CREAM-PINK

Country Girl (raised, introduced and sent by Messrs. Carters Tested Seeds, Ltd., Raynes Park, London, S.W. 20). **A.M.** June 12, 1950.—Plant very vigorous, flower stems stiff, 13 to 14 inches long, four flowered, evenly and well spaced; flowers 2¼ inches diameter, opening Porcelain Rose (H.C.C. 620/2) on a cream ground flushed later with Carmine Rose (H.C.C. 621/1).

Maiden's Blush (raised, introduced and sent by Messrs. Carters Tested Seeds, Ltd., Raynes Park, London, S.W. 20). **H.C.** June 12, 1950.—Plant vigorous, flowers stems stiff, 13 inches long, four flowered, many fives, regularly spaced; flowers 2¼ inches diameter, cream ground flushed Porcelain Rose (H.C.C. 620/3) particularly towards the margins of the standards.

FLOWERS PALE BLUE

Calcot (raised, introduced and sent by Messrs. Sutton & Sons, Ltd., Reading.) **A.M.** June 12, 1950.—Plant very vigorous, flower stems stiff, 14 inches long, mostly four flowered, some fives, well spaced; flowers 2¼ inches diameter, Veronica Violet (H.C.C. 639/1) with deeper shadings and pencilled deep violet at base of standards; wings a shade darker shaded Methyl Violet (H.C.C. 39/2).

Blue Cloud (raised and sent by B. R. Jones, Esq., Warwick Hospital, Lakin Road, Warwick). **A.M.** June 12, 1950.—Plant very vigorous, flower stems stiff, 14 inches long, mostly four flowered, some fives; flowers well spaced, 2¼ inches diameter, of good substance; standards Mauvette (H.C.C. 537) flushed Sea Lavender (H.C.C. 637/1); wings Veronica Violet (H.C.C. 639/2) faintly tinged Wistaria Blue (H.C.C. 640/1).

FLOWERS BLUE

Robert (raised by Mr. Frank Cuthbertson, introduced and sent by Ferry-Morse Seed Co., San Francisco, California, U.S.A.). **A.M.** June 12, 1950.—Plant vigorous; flower stems 12 to 14 inches long, stiff, mostly five flowered, a few sevens, well and evenly spaced; flowers 2 inches diameter, of good substance, Violet (H.C.C. 36/1) on a base of Aster Violet (H.C.C. 38/1), wings of a deeper shade.

FLOWERS ORANGE-CERISE

Vanity (raised, introduced and sent by Messrs. R. Bolton & Son, Birdbrook, nr. Halstead, Essex). **A.M.** June 12, 1950.—Plant vigorous, flower stems stiff, 15 inches long, four flowered, well and evenly spaced; flowers 2¼ inches diameter, of good substance, Geranium Lake (H.C.C. 20/2) when fully open, deepening with age, flushed Scarlet (H.C.C. 19) on a cream ground.

Bright Eye (raised, introduced and sent by Messrs. R. Bolton & Son, Birdbrook, nr. Halstead, Essex.) **H.C.** June 12, 1950.—Plant vigorous, flower stems stiff, 14 inches long, four flowered; flowers 2¼ inches diameter, Geranium Lake (H.C.C. 20/2) deepening with age, on a white ground.

FLOWERS SCARLET

Delight (raised, introduced and sent by Messrs. W. Atlee Burpee Co., Philadelphia, U.S.A.). **H.C.** June 12, 1950.—Plant vigorous; flower stems 12 to 14 inches long, four flowered; flowers 2¾ inches diameter, Scarlet (H.C.C. 19/1) with distinct veining of a deeper shade, on a cream ground.

FLOWERS CRIMSON-SCARLET

Matador (raised, introduced and sent by Mr. P. Simons, Lyndhurst Nurseries, Ardleigh, Essex). **A.M.** June 12, 1950.—Plant vigorous, flower stems 12 to 14 inches long, four flowered, a few fives; flowers 2¼ inches diameter, well and evenly spaced, of good substance, Orient Red (H.C.C. 819) with a sheen of Signal Red (H.C.C. 719).

PARSLEY AT WISLEY, 1949–50

Eighteen stocks of Parsley were sent to Wisley for trial in 1949. They were all sown on April 6 and again on July 14, 1949, and finally judged by a sub-committee of the Fruit and Vegetable Committee on April 28, 1950, who made their recommendations for awards as given below.

Light Green

The following variety was grown: PEROSO SPECIAL (P. Rood), dwarf habit.

Medium Green

The following varieties were grown: EXTRA MOSS CURLED (Daehnfeldt), MOSS CURLED IMPROVED (Hurst), MULTICURL (Associated Seed Growers), PARAMOUNT (Ferry-Morse), PEERLESS (Nutting).

Medium to Dark Green

Champion Curled (sent by Messrs. Harrison & Sons (Maidstone) Ltd., Maidstone, Kent). **A.M.** April 28, 1950.—Plant vigorous, 11 inches tall; foliage double moss-curled, medium emerald green; leaf stalks 6 inches long; stands well. A true and a regular stock.

Perennial Moss Curled (raised, introduced and sent by Messrs. Watkins & Simpson, Ltd., 27 Drury Lane, Covent Garden, London, W.C.2). **A.M.** April 28, 1950.—Plant vigorous, 11 inches tall; foliage double moss curled, medium emerald green; leaf stalks 6–7 inches long; stands well. A more closely and finely curled strain than 'Champion Curled.' A true even stock. (**F.C.C.** 1919).

The following varieties were grown: DOUBLE CURLED ASCO (Chr. Olsen), a variable stock, EVERGREEN (Ferry-Morse), EXHIBITION (Clucas), EXHIBITION (Dobbie) a variable stock, EXTRA FINE CURLED (Hurst), EXTRA TRIPLE CURLED (Ferry-Morse) a variable stock, PERENNIAL MOSS CURLED (Tozer), stock variable.

Dark Green

Imperial (raised, introduced and sent by Messrs. Sutton & Sons Ltd., Reading). **H.C.** April 28, 1950.—Plant vigorous, 9 inches tall; foliage very closely moss curled, dark green with a grey tinge; leaf stalks 4 to 6 inches long; stands well. A true even stock.

The following variety was grown: CHAMPION MOSS CURLED (Yates), distinct from the other variety sent under this name.

Very Dark Green

The following variety was grown: NEW DARK GREEN WINTER (Clucas), very variable, requires further selection.

PLANTS TO WHICH AWARDS HAVE BEEN MADE IN 1950

TREES AND SHRUBS

Eucalyptus Gunnii A.M. June 27, 1950. This is the hardiest member of the genus, forming a tree of 60 feet or more in this country. The leaves are elliptic-obovate, acute, rounded at the base, about 1½ inch long and dark bluish-green in colour. The sulphur-yellow flowers are borne in axillary stalked clusters of two or three. Exhibited by Messrs. C. H. Taudevin, Raby Nurseries, Willaston, Wirral, Cheshire.

Malus ioensis plena F.C.C. May 23, 1950. The fragrant, semi-double flowers of this attractive Crab are borne 5 or 6 together in leafy clusters. When fully expanded the individual flower is fully 2 inches in diameter; in colour it is a beautiful shade of Carmine Rose (H.C.C. 621/1) internally and varying on the outside from Rose Madder (23/3) to Tyrian Rose (24/3). It received the A.M. on May 21, 1940, when shown by Iris Lady Lawrence. Exhibited by Mrs. E. M. Holden, Goldwell, Newbury.

RHODODENDRONS

Rhododendron 'Angelo' var. 'Sheffield Park' (*discolor* × *Griffithianum*) **A.M.** June 13, 1950. This magnificent variety of the popular hybrid bears large, narrow leaves often up to eight inches in length. The heavy, globular truss is typical of its parents and is up to nine-flowered. The corolla is large, broadly campanulate, 3½ inches × 5½ inches wide and pure white, except for a faint, greenish-yellow blotch deep in the base of the tube. Exhibited by Captain A. Granville Soames, Sheffield Park, Uckfield, Sussex.

Rhododendron 'Conroy' A.M. May 23, 1950. A fine garden hybrid resulting from the cross between *cinnabarinum* var. *Roylei* and *concatenans*. The loose truss is composed of about six pendent flowers each tubular-campanulate in shape, deeply lobed, glaucous, fleshy and coloured a pleasing shade of light orange (H.C.C. 12/2) with a rosy tinge. White scales cover the calyx, pedicel, petiole, and underside of the foliage. Exhibited by Lord Aberconway, C.B.E., LL.D., V.M.H., and the National Trust, Bodnant, North Wales. (Fig. 207.)

Rhododendron 'Fascinator' A.M. April 4, 1950. A hardy flowering shrub resulting from a cross between 'Hiraethlyn' and *repens*. The truss, about nine flowered, is loose and flat-topped, bearing funnel-shaped blooms of a rich Carmine (H.C.C. 21) shot with Turkey Red (H.C.C. 721) and some faint spotting. Exhibited by Lord Aberconway, C.B.E., LL.D., V.M.H., and the National Trust, Bodnant, North Wales.

Rhododendron 'Francis Hanger' A.M. June 27, 1950. An unusual-coloured hybrid of late-flowering habit from the cross *dichroanthum* × 'Isabella.' Each large truss, composed of about seven flowers, is loose and flat-topped. The corolla is large and fleshy, with deeply cut lobes, the margins of which are frilled and edged with a delicate, light tinge of pale rose that contrasts pleasantly with the deep, yellow colouring of the remaining part of the corolla. Exhibited by E. de Rothschild, Esq., Exbury, nr. Southampton.

Rhododendron 'Gladys' var. 'Rose' (*campylocarpum* × *Fortunei*) **A.M.** May 2, 1950. The lax, irregular truss of this plant is made

up of nine flowers each with a long, red-stained pedicel. The corolla is of a pale-cream colour darkening on the upper three lobes and showing a crimson blotch in the throat; in contrast, the buds are light, rosy-pink. Exhibited by the Commissioners of Crown Lands, Windsor Great Park, Berks.

Rhododendron 'Janet' ('Dr. Stocker' × 'Avalanche') **A.M.** April 4, 1950. The robust habit of this plant makes it particularly suitable for the larger type of garden. Its flowers are nearly five inches wide, with deep lobes and waved margins. The upper three petals show a basal stain of deep crimson which is thrown into relief by the pure white of the remaining part of the corolla. Exhibited by E. de Rothschild, Esq., Exbury, nr. Southampton.

Rhododendron 'Inamorata' (*Wardii* × *discolor*) **A.M.** June 27, 1950. This hybrid exhibits the finest characters of both of its parents; the flowers are similar to those of *Wardii* and its robust habit, derived from *discolor*, will doubtless make it the subject of future hybridisation. Each flower has a long pedicel and is flat-campanulate in shape; its colour is a pale shade of yellow with a small, spotted, crimson blotch in the throat. The style is long, prominent and distinctly papillose. Exhibited by E. de Rothschild, Esq., Exbury, nr. Southampton.

Rhododendron 'Kiev' ('Barclayi' × *Elliottii*) **A.M.** May 2, 1950. Each loose, flat-topped truss of this hybrid is made up of about eight flowers. The corolla is campanulate, three inches long and four inches wide, large and fleshy with distinct, basal nectaries and coloured a deep, unusual shade of Blood Red (H.C.C. 820/3) which is darkened by heavy spotting, especially on the upper three lobes. The petiole is stout and scaly and the leaves long with a dull mat-green colouring. Exhibited by E. de Rothschild, Esq., Exbury, nr. Southampton.

Rhododendron magnificum A.M. March 21, 1950. This member of the Grande Series was collected by Capt. F. Kingdon-Ward and introduced from Upper Burma in 1931 under his number K.W. 9200. In favoured gardens it makes a fine tree with large leaves 11 inches long and four inches wide. The tubular flowers are coloured Fuchsine Pink (H.C.C. 627/2) with darker venation, and are borne in a large, dome-shaped truss. The species is, however, somewhat slow to reach maturity and it is often several years before flowering commences. Exhibited by Lt.-Col. D. R. Carrick-Buchanan, Corsewell, Stranraer, Wigtownshire.

Rhododendron 'Mariloo' var. 'Eugenie' A.M. April 4, 1950. This strong-growing hybrid from the cross 'Dr. Stocker' × *lacteum* is ideally suited to the woodland garden. Its funnel-shaped flowers, up to four inches across, are of a pale-cream colouring, darkening on the upper three lobes, marked with small, crimson spots and stained with crimson in the base of the throat. The flowers, up to seventeen in number, are borne in a large, heavy, flat-topped truss. Exhibited by E. de Rothschild, Esq., Exbury, nr. Southampton.

Rhododendron 'Morawen' A.M. May 23, 1950. A magnificent hybrid from the cross 'Isabella' × 'Shepherd's Delight.' Each leaf is up to eight inches long and three inches wide, and while of a light green colour above is somewhat paler beneath. The truss is large and heavy, consisting of up to fourteen flowers, each of which is funnel-campanulate

in shape, fleshy and of a pleasing Phlox Pink shade (H.C.C. 625/1) with the upper three petals slightly marked with dark-pink spotting. Its stamens are thirteen in number, pubescent and sited in deep, basal nectaries. Exhibited by Admiral A. Walker-Heneage-Vivian, C.B., M.V.O., D.L., Clyne Castle, Blackpill, Swansea.

Rhododendron 'Rouge' A.M. June 13, 1950. This hybrid was raised by the late Mr. Lionel de Rothschild from the parents T.L. No. 1249 × *Elliottii*. Its leaves are about eight inches long, broadly lanceolate and pale mat-green in colour. Flowers, borne in a heavy truss, are large and fleshy, 3½ × 4½ inches wide, broadly campanulate and show pronounced lobing. Exhibited by E. de Rothschild, Esq., Exbury, nr. Southampton.

Rhododendron 'Trewithen Orange' F.C.C. April 4, 1950. This beautiful hybrid is the result of a cross between 'Full House' (*cinnabarinum* var. *blandfordiaeflorum* × *Maddenii*) and *concatenans*. The truss consists of about five pendent, deeply-lobed flowers coloured a pleasing shade of Carrot Red (H.C.C. 612/1–612) with a faint, rosy blush. Exhibited by G. H. Johnstone, Esq., O.B.E., Trewithen, Cornwall.

Rhododendron 'Winsome' ('Humming Bird' × *Griersonianum*) **A.M.** May 23 ,1950. A fine vase of this plant was shown illustrating its strong, floriferous habit. The truss is irregular, loose, pendent and shows a varying number of flowers. The long corolla is coloured Neyron Rose (H.C.C. 623) with edges marginate and slightly waved. The leaves are similar to its parent *Griersonianum*, being mucronate, recurved, dull green above, and the underside covered with a loose brown tomentum. Exhibited by Lord Aberconway, C.B.E., LL.D., V.M.H., and The National Trust, Bodnant, North Wales. (Fig. 208.)

ROSES

Rosa anemonoides 'Ramona' A.M. May 23, 1950. This vigorous climbing Rose is a sport from *R. anemonoides*, and has single flowers, 3½ inches across, of Persian Rose (H.C.C. 628), paler on the reverse of the petals (628/3). Exhibited by Messrs. T. Hilling & Co., Chobham, Woking. (Fig. 210.)

Rose 'Claude' A.M. June 27, 1950. A fully double bright crimson, long petalled H.T. variety of good shape, raised in France by Monsieur Charles Mallerin. Exhibited and introduced by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham.

Rose 'Eden Rose' A.M. July 11, 1950. A H.T. variety raised in France by Monsieur F. Meilland and having very full, sweetly scented, bright madder-pink flowers of good shape. Exhibited and introduced by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham.

Rose 'Monique' A.M. June 27, 1950. A strongly scented H.T. variety with large fully double glowing Rhodamine Pink (H.C.C. 527) flowers of perfect shape reminiscent of 'Picture' but with greater substance. The plant is a stiff strong grower and was raised in France by Monsieur Francis Meilland. Exhibited and introduced by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham.

Rose 'Moonbeam' A.M. July 11, 1950. A finely shaped primrose-yellow (H.C.C. 601/2) H.T. variety deepening to aureolin (H.C.C. 3) at the base of the petals. It was raised by Mr. Herbert Robinson as the result of a cross between 'McGredy's Yellow' and an unnamed Rose No. 5. It is said to be a good forcing variety. The flowers have a good scent and are borne on remarkably strong stems. Introduced by Messrs. Bakers, Ltd., Wolverhampton. Exhibited by Mr. Herbert Robinson, Victoria Nursery, Burbage, Hinckley, Leicester.

Rosa spinosissima 'Fruhlingsgold' A.M. May 23, 1950. This makes a graceful shrub up to 8 feet tall, with plentiful semi-double flowers, up to 4 inches across, of Mimosa Yellow (H.C.C. 602/3). The leaves are made up of about 7 leaflets, pubescent on the underside. Exhibited by Messrs. T. Hilling & Co., Chobham, Woking. (Fig. 209.)

Rose 'Sultane' A.M. June 27, 1950. A well shaped, strongly perfumed, fully double H.T. variety with Cherry (H.C.C. 722) petals having a saffron yellow (H.C.C. 7) reverse. It is a good grower and was raised in France by Monsieur Francis Meilland. Exhibited and introduced by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham.

Rosa 'Wedding Day' A.M. June 13, 1950. An extremely handsome climbing Rose raised by the exhibitor by selfing a hybrid from the cross *R. Sinowilsoni* × *R. Moyesii*. The vigorous, arching growths, bearing shining, light green leaves composed of five oval leaflets, reach a height of ten feet or more. The sweetly-scented flowers are arranged in shapely panicles about 9 inches long at the ends of spreading lateral branchlets. The buds are at first Naples Yellow (H.C.C. 403) and open to saucer-shaped, creamy-white flowers 2 inches across with broad obovate petals and large clusters of saffron-yellow stamens. Exhibited by Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea, Sussex.

Rose 'Yves Latieulle' (shown as Mme. Yves Latieulle) **A.M.** July 11, 1950. A large rich lemon yellow, H.T. variety, with fully double flowers of excellent shape. It was raised in France by Monsieur F. Meilland. Exhibited and introduced by Messrs. Wheatcroft Bros., Ltd., Ruddington, Nottingham.

Syringa vulgaris 'Primrose' A.M. May 23, 1950. This variety has flowers of a colour not normally found among Lilacs. It is Empire Yellow (H.C.C. 603/2) in the bud, fading paler as the flower ages, although each floret retains the deeper shade in the centre. The huge branches exhibited show that the plant forces well. Exhibited by Mr. Jan Spek, Boskoop, Holland.

ROCK GARDEN PLANTS

Androsace pyrenaica A.M. April 4, 1950. This distinct species is to be found naturally in the Central Pyrenees. The uniform cushion is composed of rosettes of longish, blunt leaves, somewhat hairy. The flower stems reach up to ½ inch in length with each carrying a single, white flower. These are 5-petalled, emarginate, and have a bright, yellow eye. Exhibited by C. H. Hammer, Esq., The Old Rectory Boreham, Essex.

Anemone vernalis A.M. March 29, 1950. Found naturally in high alpine grasslands throughout Europe, this early-flowering species has proved a fine garden plant. Its leaves are pinnately divided into 2 or 3 pairs of toothed leaflets appearing on a densely hairy stem. The buds, covered with long rust-coloured hairs, are coloured a pearly white inside and stained with a light purple on the outside. As the flower develops the opening petals reveal a dense cluster of bright golden stamens. Exhibited by Mrs. A. N. Griffith, Paradise House, Newnham, Cambridge.

Campanula garganica var. fenestrellata A.M. June 27, 1950. A hardy plant about 2–3 inches high which will enhance any open, well-drained site with its floriferous habit and long flowering period. The star-shaped flowers are of a bright, lavender-blue colour with a white-fringed centre, made prominent by the slight reflexing of its petals and by its long style. Exhibited by Mrs. A. N. Griffith, Paradise House, Newnham, Cambridge.

Campanula pelia A.M. May 23, 1950. Many wild forms of this prostrate alpine have been collected from time to time. Flowers, which are borne freely among the grey foliage, are tubular in shape with five distinct segments and coloured a pleasing shade of light velvet-blue. Exhibited by H. Clifford Crook, Esq., 4 Alexandra Crescent, Bromley, Kent.

Campanula pilosa var. dasyantha A.M. April 25, 1950. Flowers of this Japanese species appear singly on leafy stems. The perianth made up of distinct, hairy sepals and a corolla of violet-blue petals with a white inner lining. Its leaves are a bright, olive-green colour, serrate and about 1 inch long. Exhibited by R. E. Heath, Esq., 13 Maybury Close, Petts Wood, Kent.

Dionysia bryoides A.M. February 14, 1950. A particularly fine specimen of this plant was shown bearing numerous, 5-petalled, starry flowers. These were coloured Fuchsine Pink (H.C.C. 627/3) with a small white eye, while the buds, almost stemless and arising from tight rosettes of leaves, are the darker shade of Fuchsia Purple (H.C.C. 28/1). The plant is not one of easy culture and conditions approximating to its natural habitat necessitate the use of a sharp, sandy compost, good drainage and the utmost care in watering. Exhibited by C. H. Hammer, Esq., The Old Rectory, Boreham, Essex.

Iris cristata A.M. April 18, 1950, as a hardy flowering plant, suitable for the rock garden or alpine house. A native of the south-eastern United States of America from Georgia to Ohio. This species, which belongs to the Evansia section, is practically stemless and the flowers are carried on the perianth tube which rarely exceeds four inches. The rhizome increases rapidly and produces a vertical tuft of three or four leaves. The flowers are borne singly or in pairs. Standards Veronica Violet (H.C.C. 639/1) flushed Sea Lavender Violet (H.C.C. 637/2). Falls Aster Violet (H.C.C. 38/2) with a central white ridge or crest to the haft where it is tipped with yellow and white. Shown by Mr. J. O. Sherrard, Shaw Nursery, Newbury, Berks.

Primula 'Bractworth' A.M. March 7, 1950. This pleasing hybrid is the result of a cross between *Primula bracteosa* and P. *Edgworthii*. The lanceolate leaves are about 3 inches long and very heavily coated in

farina. Its numerous flowers are of a Mallow purple colour (H.C.C. 630) with a distinctive, central eye of Citron Green (H.C.C. 763/2) ringed with white. Exhibited by Mrs. C. B. Saunders, Husseys, Green Street Green, Farnborough, Kent.

Primula eburnea A.M. May 2, 1950. This species, recently sent home by Messrs. Ludlow and Sherriff, was first collected in 1915 by Mr. R. E. Cooper when he found it growing at high altitudes among peaty turf and glacial debris. The flowers are of a pale cream colour and are borne in a tight cluster on a 8-inch stalk. The leaves of the plant are somewhat lax, irregular in shape and are deeply serrated. Exhibited by J. T. Renton, Esq., Branklyn, Perth.

Sempervivum arachnoideum var. Laggeri A.M. June 27, 1950. A particularly fine pan of this plant was shown well illustrating its floriferous habit. A succession of brick-red coloured flowers, centred with numerous stamens appear in terminal clusters, each consisting of about nine blooms in each head. These are borne on a long, leafy scape arising from a basal rosette typical of the genus although, in this case, particularly well-covered with cob-webbing. Exhibited by W. Howell, Esq., The Town Hall, Beckenham, Kent.

Vaccinium Delavayi A.M. May 23, 1950. This Yunnanese shrub is not of difficult culture and is suited for both the Alpine House and the Rock Garden. Small, white flowers appear on the compact branches in May and are followed by black berries with a greyish bloom, typical of the more common members of the genus. Exhibited by R. E. Heath, Esq., 13 Maybury Close, Petts Wood, Kent.

BULBS, CORMS, AND TUBERS

Allium albopilosum A.M. June 13, 1950. This very striking herbaceous plant is probably the largest flowered species of the genus, and it was first introduced to cultivation from Persia in 1901. The strap-shaped, hairy leaves are about 18 inches long and 2 inches wide; the scape is erect, about a foot long, bearing a dense globular head of about 80 flowers. Each has 6 spreading, linear tepals of a deep lilac colour with a satin sheen, which become rigid as the flower ages. Exhibited by Sir Cedric Morris, Benton End, Hadleigh.

Begonia 'Shirley Desire' A.M. July 11, 1950. A trailing variety suitable for cultivation in hanging baskets. The bright carmine rose flowers are 4 inches across and very fully double. They are produced in great profusion on the long growths which measure up to 3 feet in length. Raised, introduced and shown by Messrs. H. Woolman, Ltd., Shirley, Birmingham.

Lilium Mackliniae A.M. May 23, 1950. A new species collected by Capt. F. Kingdon-Ward on Sirhoi Peak, nr. Ukrhul, Manipur in 1946, and fully described and illustrated in the JOURNAL for August, 1949. It promises to be hardy, and in the garden forms a plant about 18 inches high with densely leafy stems bearing a terminal group of 2 or 3 flowers. The flower is nodding, bell-shaped, about 2 inches long, white, flushed externally with rosy-purple. Exhibited by Col. F. C. Stern, O.B.E., M.C., F.L.S., V.M.H., Highdown, Goring-by-Sea, Sussex.

Lilium 'Dunkirk' A.M. June 27, 1950. A most striking hybrid raised by Mr. F. L. Skinner of Manitoba. The stout stem is nearly five feet tall, covered with dark green, lanceolate leaves about 5 inches long, and bears a terminal, many-flowered raceme of well-spaced and long-stalked flowers about 4 inches across. The colour is best described as a lustrous and glowing mahogany-red, and is intensely rich in full sunshine. The perianth-segments are 2½ to 3 inches long, recurving, with a distinct bearded crest near the base, and speckled with small, dark, raised spots. Exhibited by W. Bentley, Esq., Quarry Wood, Burghclere, Newbury. (Fig. 199.)

Narcissus 'Frigid' F.C.C. May 23, 1950. As a variety for exhibition. This Small-cupped variety (Division 3c) received an **Award of Merit** on May 20, 1947. See JOURNAL 72, 405. Raised and shown by Mr. Guy L. Wilson, The Knockan, Broughshane, Co. Antrim, Northern Ireland.

Narcissus 'Santa Claus' A.M. May 23, 1950. As a variety for exhibition. A well-formed fully double white variety of *Narcissus poeticus* with a flower about 3 inches in diameter borne on a 20-inch stem. Raised and shown by Mr. Guy L. Wilson.

ORCHIDS

Cymbidium 'Albania' var. 'Delight' A.M. May 23, 1950. The spike bore seven whitish flowers, the labellum lightly spotted with rose. The result of crossing *albanense* with *Alexanderi*. Raised and exhibited by Messrs. Sanders, St. Albans.

Cymbidium 'Clare Armstrong' var. 'Greensleeves' A.M. May 23, 1950. The spike bore eight flowers, light greenish cream colour, the labellum bordered with crimson. Produced by crossing *Alexanderi* with 'Mirella.' Raised and exhibited by Messrs. Armstrong & Brown, Tunbridge Wells.

Laeliocattleya 'Arcadia' A.M. May 23, 1950. The flower has broad sepals and petals and a well-developed labellum. In colour rosy mauve, the labellum crimson-purple. The result of crossing *Lc.* 'Jupitus' with *Lc.* 'Areca.' Raised and exhibited by McBean's Orchids Ltd., Cooksbridge.

Odontioda 'Marispum' var. 'Dainty' A.M. June 13, 1950. The spike bore seven large, well-formed flowers, blush rose, all the segments minutely spotted with rose-purple. The result of crossing *Oda.* 'Marie Antoinette' with *Odm. crispum*. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath.

Odontoglossum 'Mary' var. 'Chromos' A.M. May 23, 1950. The spike bore six well-formed flowers, chrome-yellow with red-brown markings. The result of crossing 'Brimstone Butterfly' with *triumphans*. Exhibited by the Hon. Mrs. Ionides, Buxted Park, Uckfield.

Odontoglossum 'Princess Elizabeth' A.M. June 13, 1950. The tall spike carried ten large flowers, resembling a glorified form of *O. crispum*. Blush-white with light rose suffusion on the backs of the segments. The result of crossing O. 'Faustina' with *O. crispum*. Raised and exhibited by Messrs. Charlesworth & Co., Haywards Heath.

HERBACEOUS PLANTS

CARNATIONS

Carnation 'Allwood's Golden Glory' A.M. May 23, 1950, as a variety for exhibition and market. A perpetual flowering variety with a good stiff stem and of good form and substance. Flowers fully double, 3½ inches diameter, Mimosa Yellow (H.C.C. 602/1) flaked with Scarlet (H.C.C. between 19 and 19/1). Raised and shown by Messrs. Allwood Bros., Ltd., Wivelsfield Nurseries, Haywards Heath, Sussex.

BORDER CARNATIONS

Border Carnation 'Lothersdale' A.M. July 11, 1950, as a show variety. Flower stems stiff and erect, 13 inches long; flowers flattish, open, with a small tuft of petals at the centre, 3 inches diameter; petals flat, broad, yellow ground fancy, heavily edged and flaked with deep crimson; calyx strong. Shown by W. Whiston, Esq., Lothersdale, Far Heath, Winterley, Sandbach.

Border Carnation 'Royal Mail' F.C.C. July 18, 1950, as a show variety. Described R.H.S. JOURNAL **74**, 511. Flowers bright pillar-box red. Raised and shown by Mr. F. W. Goodfellow, Valley Nurseries, Aldridge, Staffs. (**A.M.** 1949).

Border Carnation 'Sunstar' A.M. July 18, 1950, as a show variety. Flower stems erect, stiff, 20 inches long. Flowers double, 3 inches diameter with a small tuft of petals at the centre; petals flat, entire, soft yellow edged and lightly flaked with scarlet. Raised and shown by Mr. F. W. Goodfellow, Valley Nurseries, Aldridge, Staffs.

DIANTHUS

Dianthus 'Show Discovery' A.M. June 13, 1950, as an exhibition variety. Flower stems strong, erect, 15 inches long. Flowers double, 2½ inches diameter, flat, strongly scented, deep rich rose-red with a ruby eye. Raised and shown by Messrs. Allwood Bros., Ltd., Haywards Heath, Sussex.

Dianthus 'Show Pearl' A.M. June 13, 1950, as an exhibition variety. Flower stems 15 inches long, strong, upright. Flowers semi-double, 2¼ inches diameter, flat, with a few tufted petals at centre, creamy-white with a slight green eye. Raised and shown by Messrs. Allwood Bros. Ltd., Haywards Heath, Sussex.

Dianthus 'William Brownhill' A.M. June 13, 1950, as an exhibition variety. Flower stems 12 inches long, strong, erect. Flowers 1¾ inch diameter, semi-double, flat, open, somewhat scented, white ground laced and zoned maroon. Shown by Messrs. Thomas Carlile (Loddon Nurseries) Ltd., Carlile's Corner, Twyford, Berks.

Dicentra formosa alba. A.M. May 23, 1950. *Dicentra formosa* is a small herbaceous plant suggesting a small edition of the 'Bleeding Heart,' to which it is closely allied. It has a tuft of pale green, ternately compound, rather fern-like foliage and slender arching racemes of penduious flowers, typically rosy-purple, but pure white in this variety. Exhibited by Messrs. C. G. Van Tubergen, Ltd., Haarlem, Holland.

IRISES

Iris 'Jemmy O'Goblin' A.M. May 23, 1950, for general garden use, as a hybrid between *I. innominata* and *I. Douglasiana*, with rather narrow dark green foliage. Flowers 3 inches diameter, 2 inches deep. Standards erect, 1¾ inch long, ¾ inch wide, Buttercup Yellow (H.C.C. between 5/1 and 5/2) suffused with Chinese Yellow (H.C.C. 606/1). Falls drooping, 1 inch long, ¾ inch wide, Buttercup Yellow (H.C.C. 5/2) heavily suffused with Chinese Yellow (H.C.C. 606/1) blotched Saffron Yellow (H.C.C. 7). Raised and shown by H. Senior Fothergill, Esq., 12 Abercorn Place, London, N.W. 8.

Iris 'Tranquil Dale' A.M. May 23, 1950, for general garden use, as a hybrid between *I. innominata* and *I. Douglasiana*, with rather narrow dark green foliage. Flowers three inches diameter, two inches deep. Standards 1¾ inch long, ¾ inch wide, soft Chrome Yellow (H.C.C. 605/2) flushed with soft bronzy purple. Falls drooping one inch long, 1½ inch wide, somewhat of a deeper shade than the standards but with deep brown feathering. Raised and shown by H. Senior Fothergill, Esq., 12 Abercorn Place, London, N.W. 8.

Iris spuria 'Lilacina' A.M. June 13, 1950. An Apogon Iris from Kashmir, 3 feet in height with dark green foliage. Flower spikes 4 or 5 flowered. Standards erect, broad lanceolate, 2½ inches long, ¾ inch wide, margins waved, Sea Lavender Violet (H.C.C. 637) with a Mineral Violet (H.C.C. 635/1) flush towards the base. Falls drooping 1½ inch long, 1⅛ inch broad, almost circular, waved at margins, Veronica Violet (between H.C.C. 639 and 639/1) with darker veining, with a central bright yellow streak midway to haft. Shown by Col. F. C. Stern, Highdown, Goring-by-Sea, Sussex.

Paeonia arietina 'Hilda Milne' A.M. May 23, 1950. A lovely single Paeony with cup-shaped flowers 4 inches across of Rose Madder (H.C.C. 23/3) shading to Tyrian Rose (24/2) on the edges of the petals. The filaments surrounding the tomentose carpels are pale pink, stained crimson at the base, the anthers yellow. The leaves are bipinnate with about 11 leaflets, light green above, glaucous beneath, their margins slightly undulate. Exhibited by Miss Milne, Dykes, Henfield, Sussex.

Primula 'Viatans' A.M. May 23, 1950. A hybrid between *P. Viali* and *P. nutans*. The flowers, intermediate in size between those of the parent species, are of a soft, rosy-heliotrope colour, pendent in a dense spike 3 inches long. The scape is 15 inches tall, rising from a rosette of oblanceolate, irregularly dentate, downy leaves. Exhibited by the Bartley Nurseries, Bartley, Southampton.

BOOK NOTES

"La Taille des Arbres Fruitiers." By Paul Champagnat. 8vo. 217 pp. Illus. (La Maison Rustique, Paris VI[e]). 510 francs.

A brief notice cannot hope to do justice to what is undoubtedly the most complete and important book on the pruning of fruit-trees so far published in any language, and one likely to become authoritative. M. Champagnat, who is Chef de Travaux of the Strasbourg Institut Botanique, divides his material into three parts:—1, the

tree, its metabolism, morphology, and physiology; 2, pruning for formation; and 3, pruning for yield. In the last section four systems, copiously illustrated, are considered in detail:—Short-Spur Pruning (*système trigemme*); Modified Spur-Pruning (*système polygemme*); the Lorette System, with an interesting note on Lorette's precursor, J. Desbois; and Arching, exemplified both by the Lepage "*palmettes à longs bois arqués*" (a succession of single cordons of no great height forming double or even triple tiers of branches trained downwards in alternating directions) and the German "*Spindelbusch*" formation with horizontally trained branches for bush trees. Each problem is first exactly stated; its possible solutions are then lucidly described and their respective advantages and drawbacks impartially set forth. This book is almost unique of its kind in that the existing limits of pomological knowledge are everywhere firmly underlined, a check which proves particularly illuminating in the analyses of the various theories advanced to explain "*le barrage de sève*" and the pros and cons of staking. Since even trees of the same variety evince as much individuality in growth as do men, there can be no universally applicable "right form" for one and all of them. Hence the grower is urged to acquire the habit of reflecting and reasoning before using the knife when he looks over his trees. "In this way he will quickly learn the relatively simple 'how' of pruning, and also begin to gain an inkling into the far more baffling 'why'".

M. Champagnat suggests that as repeated tests show no tangible difference in results between November and March pruning, early October may be the ideal time, because, though growth has virtually ceased, the shoots still retain their foliage. We are told that the Germans, having a much wetter climate than France, were quite logical in giving up close pruning: a reason that would seem to apply with even greater force to England. There are valuable incidental notes on Dalchow's "*Starhaugenschnitt*" for nursery work, and the so-called "*Palmette de Montreuil*," a labour-saving type of fan for walls, "*formée au diable*," which has proved a very heavy-cropping formation for that tender dessert apple 'Calville blanc.' Almost the only points the author allows himself to stress are consistently long pruning for weak growth, the fruitful uses to which "robber" shoots should be turned, and the necessity for regular thinning of both blossom and fruit to correct bi-annualism.

During the war the author was deported by the Germans from France to Prussia for agricultural work, an experience which, however unpleasant for him, has added to the value of the book by giving him a practical acquaintance with German in addition to French pruning methods.

P. MORTON SHAND.

"An Introduction to Botany." By J. H. Priestley and Lorna I. Scott. Second ed. Pp. xii + 625. 169 Illus. (Longmans, Green & Co.) 21s.

The many hundreds of students, not only of Leeds University but of many other teaching centres, who have relied upon Priestley & Scott's "Introduction" for their knowledge of general botany will welcome the appearance of a revised edition of the famous work. Written though it was for first-year students, it startles always by its erudition and its original and stimulating approach. Professor Priestley, whose death during the war was so great a loss to the botanical world, was above all things a physiological botanist rather than a physiologist, that is, he interpreted botanical phenomena in terms of physiological function and his teaching differed from that of so many of the classical schools of botany in that physiology was taught not as a separate subject of botany but rather as the co-ordinating thread running through all morphological and histological studies.

Beginning with descriptive morphology of seed and seedling, shoot and leaf, the book passes to the microscopical structure of the stem apex and of the leaf, pausing then to consider the chemical processes of the plant as exemplified in the laboratory of the leaf before continuing to stem and root structure. Consideration of this last leads naturally to the physiology of absorption and nutrition and the special problems of saprophytism and parasitism.

A chapter on the reproductive phase reveals a most remarkable omission—no mention is made of the large, though admittedly very incomplete, field of developmental physiology. Vernalization, photoperiodism and the phenomena of dormancy are not even mentioned. Perhaps the omission of this even in a second edition, prepared after the senior author's death, may be explained by Professor Priestley's opposition, to the end, to the hormone concept of plant growth and behaviour, for it is only in such terms that we can hope to attain any understanding of these complex but vitally important problems. Even the fundamental and conclusively-proved function of "auxins" in growth-phenomena is cautiously and grudgingly accepted, but dismissed in two or three pages. In the original edition even this scant tribute was not paid.

The book concludes with a brief though, for its purposes adequate, survey of life cycles in the vegetable kingdom and of genetical principles and a chapter on the biology of flower and fruit.

Apart from the omission mentioned, the book is a remarkable treatise and interpretation of botanical knowledge which covers, at least in many aspects, more than its authors modestly claim for it, a course for first-year students.

R. H. STOUGHTON

"Snowdonia, the National Park of Wales." By F. J. North, B. Campbell and R. Scott. Col. Pls. Illus. xviii + 469 pp. (Collins.) 21s.

"Snowdonia" is the first of the New Naturalist series to be devoted to a complete regional survey, and it is the work of more than one author. It is, in fact, three books (each of which might well have been published at half-a-guinea) in one. Dr. F. J. North introduces the reader to Snowdonia by an account of the "Geology and Physical background." He wisely assumes that his public has little knowledge of matters geological, but it may be that the amount he endeavours to impart will overawe and discourage not a few would-be readers. This section is certainly difficult reading in parts; on the other hand, it seems much more complete than the two that follow.

Dr. Bruce Campbell contributes the account of the natural history of Snowdonia, the botanical aspects of which will be taken as the chief interest of readers of this review. The approach to this section is through a brief survey of the Naturalists of North Wales; an appropriate opening, as throughout the succeeding chapters they are frequently quoted. Herein lies a weakness, for the reader of such a book as this may reasonably expect to find an account written from extensive and intimate personal experience. In this he will be disappointed; though we are given an interesting picture of the wild life, which will encourage the new naturalist to visit Snowdonia and may open the eyes of many an older naturalist who already knows the area. Dr. Campbell's persistent citation of authorities, on whom he has relied to fill up the gaps in his personal observations, doubtless springs from a praiseworthy scientific caution; but it detracts considerably from the pleasure of reading a book that is not, after all, a scientific treatise. The botanist will quickly observe a number of discrepancies between the names used in the text and those in the full list of species which is given as an appendix and this rather emphasises the compilatory nature of the work. There are other disturbing errors: on p.276 there is a reference to Alder Buckthorn (*Rhamnus cathartica*), the latin name is, of course, that of the common Buckthorn and one wonders which was intended. On p. 289 "Rock cress (*Spergula rupestris*)" is completely baffling! Is the plant intended some rock cress such as *Arabis petraea* or is it the Sea Spurrey (*Spergularia rupestris*)? In the Appendix "Hypericum undulatum, Imperforate St. John's Wort" may be taken as an error for *H. dubium*, for *H. undulatum* is neither imperforate nor a native of Snowdonia. One other even more incredible entry has been passed; as a result, presumably, of the omission of two whole lines the appendix has "Orobanche apiculata Wallr. Broomrape. Parasitic on hazel." One can supply the missed lines as follows "Orobanche apiculata Wallr. Broomrape. Parasitic on leguminous herbs, etc. Lathraea squamaria L. Toothwort. Parasitic on hazel." Incidentally the broomrape should still be called *O. minor* Sm. (the name by which it has long been known) and not *O. apiculata* Wallr. To cite these errors is by no means to deny that this section doubtless forms by far the best introduction to the wild life of Snowdonia that is available.

The third section, by Dr. Richenda Scott, deals with the human associations of the area and is the most readable of all three. It is certainly a praiseworthy innovation to have in a naturalist's handbook such an account of man's varying activities in historic times and the botanist will find in this section the clue to much of the present-day pattern of vegetation.

The volume, as are the others of this series, is well provided with coloured illustrations of which the main criticism must be that they present Snowdonia as a land of almost perpetual blue skies and sunshine. All too many holiday visitors will testify to the inaccuracy of this impression. Typographically the text is pleasing, but the printing in the small fount of the appendix is sadly below standard, letter after letter being deprived of corners or serifs by bad printing. To have produced such a volume almost simultaneously with the passing of the National Parks Act suggests publication under pressure and perhaps some sacrifices both in the time allowed to the authors for field studies and in actual printing were knowingly accepted. Whatever its blemishes this is a book that the naturalist visiting Snowdonia should certainly read.

E. L. BURTT

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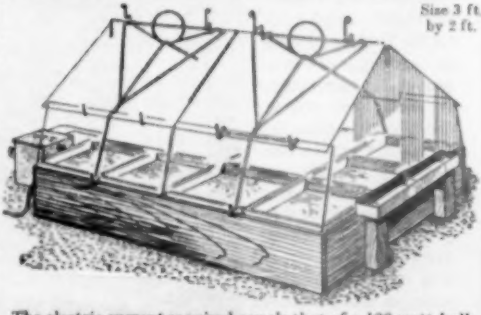

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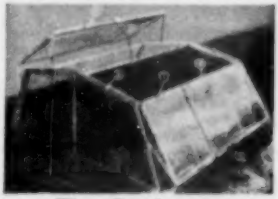

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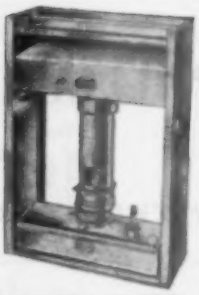

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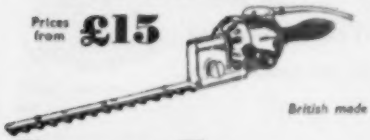

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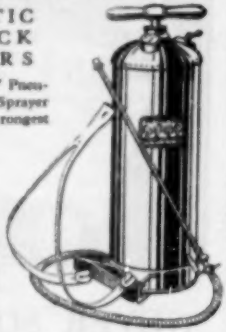

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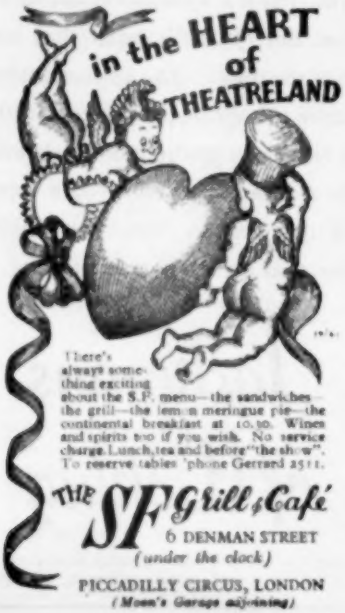

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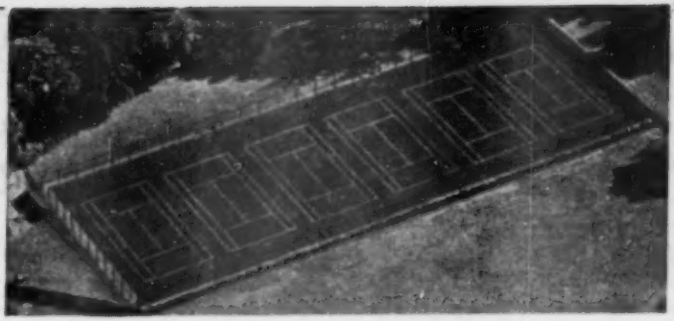

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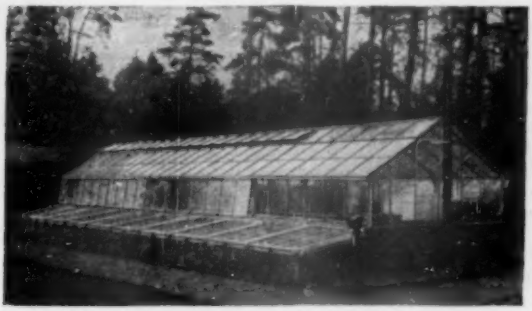

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